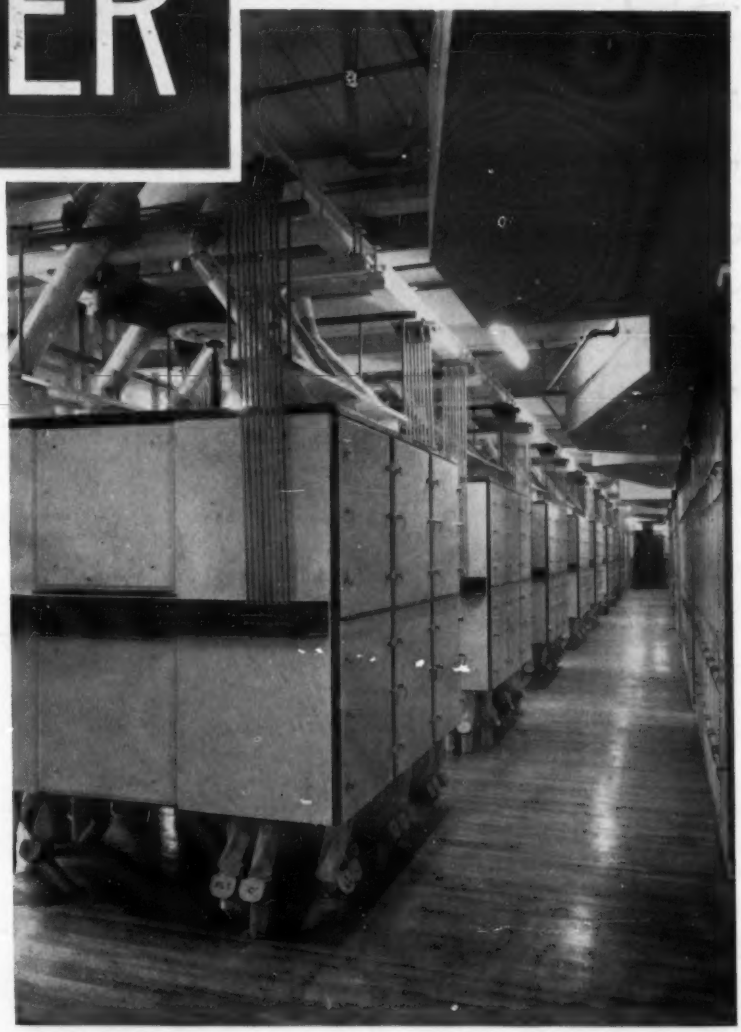
the NORTHWESTERN MILLER

THE INTERNATIONAL NEWS MAGAZINE FOR THE GRAIN, MILLING AND BAKING INDUSTRIES



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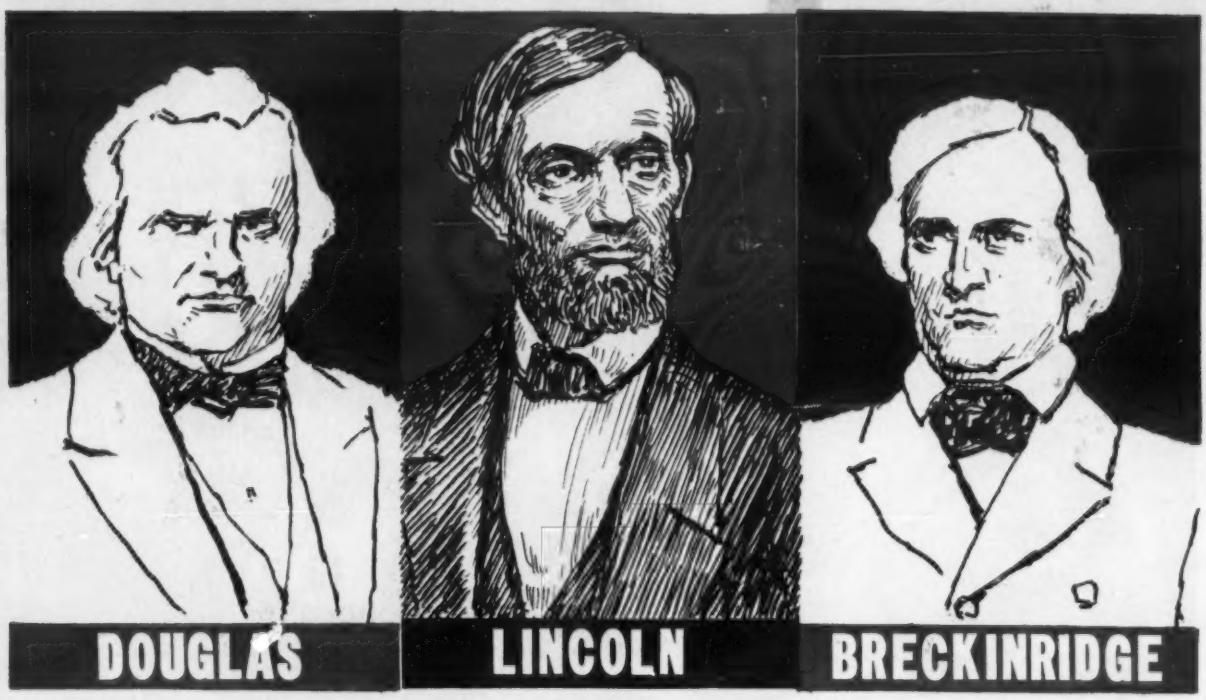
Volume 264 JULY 25, 1960 Number 2

Stone Ground

BAKERY PROVED
FLOUR



IF YOU WERE A MILLER IN 1860 WHICH ONE WOULD HAVE BEEN YOUR CANDIDATE?

Southern Democrats picked Breckenridge, northern Democrats Douglas and the new Republican party chose Lincoln who was subsequently elected.

The country was in turmoil with southern hot-heads demanding secession and more moderate counsel on both sides trying to preserve the Union. But animosities, long checked, were unbridled and nothing could avert the tragic war which was imminent.

One hundred years ago millers were beginning to emerge as important mass production specialists. Local mills were still doing a good business but big roller mills were being built and national trade marks, for first time, were soon to be recognized as symbols of quality milling products.

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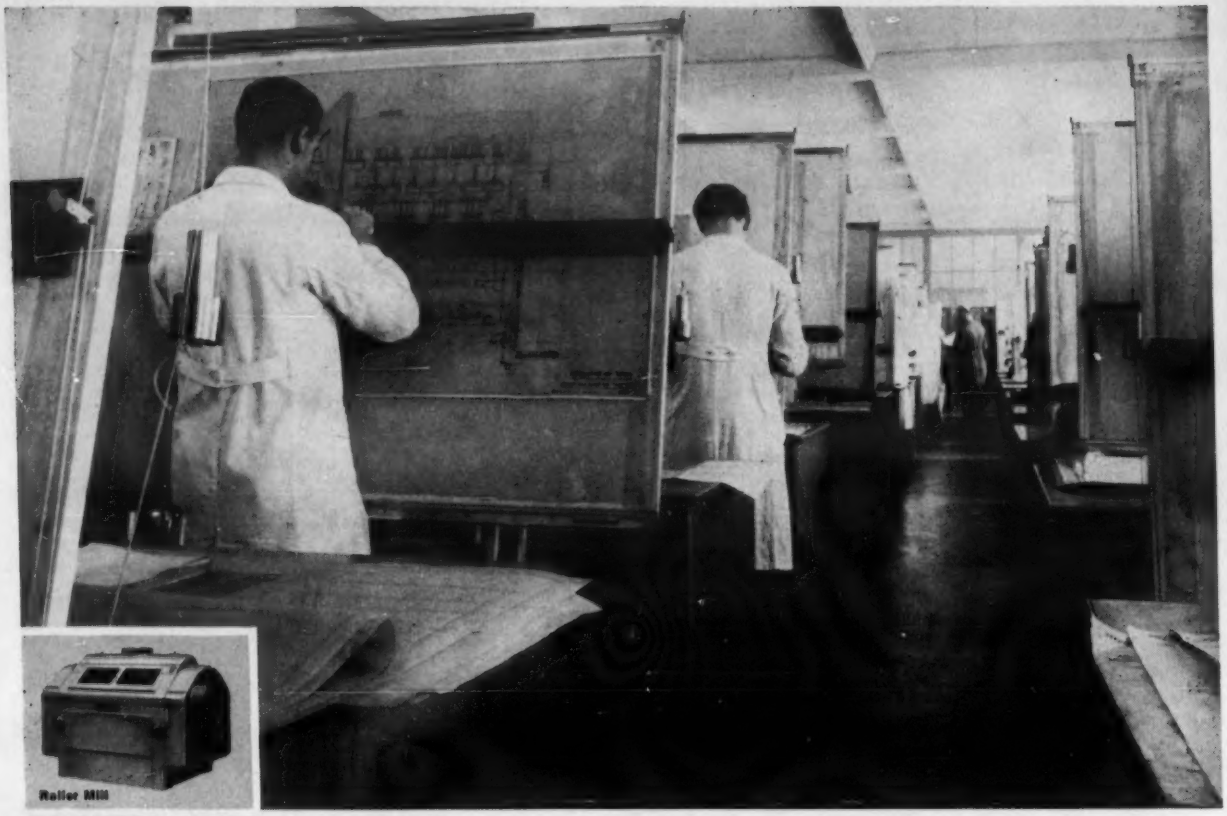

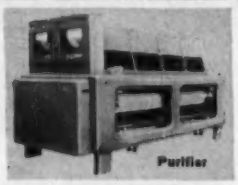

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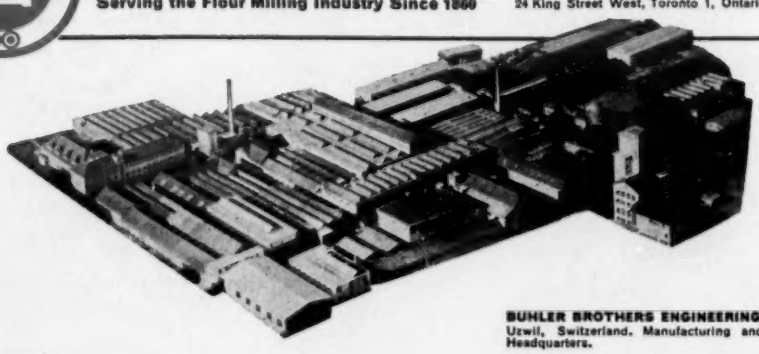

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the NORTHWESTERN MILLER

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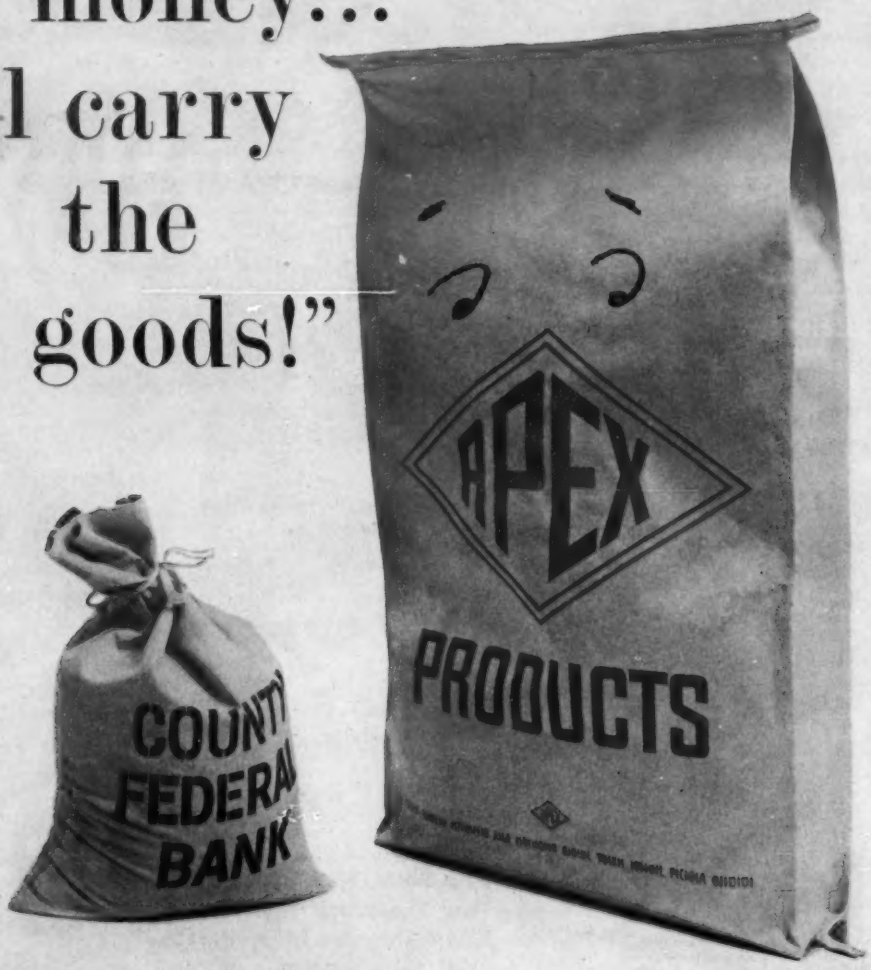
COVER PICTURE—

The sifter floor in a mill equipped by Henry Simon, Ltd., the British engineering firm — affiliate in the U.S. is Simon-Carter Co.

"You tote the money... I'll carry the goods!"



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Two Veterans, George Kelley and Henry Putnam, Retire

MOVING INTO RETIREMENT this month of July are two veterans who have been associated with the grain and flour milling industries for more years than they care to remember—but which are remembered with a great deal of gratitude by those who had the good fortune to be associated with them.

Bay State Milling's George E. Kelley has retired on reaching the mandatory age of 65. And Henry O. Putnam, secretary of the Northwest Crop Improvement Assn., has retired after 39 years of service to the grain producers and users in Minnesota, the Dakotas and Montana.

Both have made noteworthy contributions in their respective areas of interest, and those areas neatly dovetailed, the one with the other.

Mr. Kelley, besides working diligently for his own company, served the industry generally through the Millers National Federation. He helped to build those better markets and better products which any progressive industry must have. And Mr. Putnam helped to build the desire to produce better grain to meet the demands of those markets.

Both men were hailed and farewelled by their friends and associates at commemoration dinners—Mr. Kelley in Winona, Bay State milling headquarters, Mr. Putnam in Minneapolis.

But there is another likeness, transcending in importance all else. Both men are enthusiastic boosters of their product. They never lose a chance to talk of the tasks to which they had dedicated their lives. The grain and milling trades are that much richer for their presence these many years.

Mr. Kelley started his career with the Grafton Roller Mills in South Dakota. Then, in 1927, he threw in his lot with the Bay State Milling Co. starting as western divisional sales manager. He moved upwards to general sales manager, general manager, vice president, thence on to the board, ending his career as executive vice president.

The quiet, unassuming George Kelley has been a valuable member of the flour milling business. A shrewd salesman, a worthy competitor, he earned and deserved the high regard in which he is held. Because of men like Mr. Kelley the flour business is a good business to be in, come hell or high water and low prices.

And the quiet, unassuming Mr. Putnam is held in like regard. He edited three editions of the Dictionary of Spring Wheat Varieties and requests have come for it from all over the world. And he is the author of many pamphlets on grain.

Mr. Putnam's association has now merged with the Rust Prevention Assn., with a new name—the Crop Quality Council.

Council chairman Don Stevens of General Mills, Inc., put it admirably at the retirement dinner, chairmanned expertly by GMI's Royce Ramsland, when he said that the best tribute the growers and millers could pay to Mr. Putnam was to ensure that his life's work was carried on as enthusiastically as ever. The retirement ceremony, besides honoring Mr. Putnam, effectively backgrounded the work of crop improvement, now to be carried on by Don Fletcher and Gene Hayden of the Crop Quality Council.

Mr. Kelley and Mr. Putnam are symbolic of the tradition which has made the grain and flour industries what they are today—progressive and valuable components of the commercial community.

Conventions, Past and Present, and the Farm Problem

GRAIN MEN AND MILLERS, no matter their particular political persuasion, have never been afraid to stand up and be counted among the most persistent critics of government programs aimed at aiding agriculture. Why? Because aid invariably means controls and controls, in turn, mean interference with the laws of economics and the workings of the free market.

It is true that some measure of governmental control on industry is needful; the policy of laissez faire belongs to the 19th century.

Though standing on the sidelines, grain and flour traders cannot afford to remain aloof from the panderings of the politicians. What was done at Los Angeles and what is being done in Chicago this week could have a major impact on their businesses.

An anxiety born of trepidation colors their attitude. And that anxiety has been a breeding ground for opposition and even antipathy to government interference generated by politicians. The farm problem started at political conventions over 30 years ago. Many members of the trade today—those who have not yet hit the half century mark in their lives—were either not around or were not of an age to recall the start of the problem. They have heard but fragmentary evidence of the phantasmagoria which surrounded the birth of the farm programs three decades ago.

Back in 1929, as the result of an ill-conceived agricultural plank in the Republican party platform of the year before, there was born an economic monstrosity called the Federal Farm Board. It, in turn, performed something of a genetical miracle by giving birth just a year later to a government body which was named the Grain Stabilization Corp.

Though the baby was ushered into the world under the skillful and adept surgery of top level congressional obstetricians, this half billion dollar bonus baby died before it was four years old. It died not from malnutrition but from over-feeding.

The collapse of this experiment in economic tinkering did not daunt the Democrats. At their 1932 convention, the farm plank was nailed to the platform with an iron clad pledge "not to repeat the mistakes made by the Republicans." They didn't. They made bigger ones.

And the newest tyro in grain and flour knows the rest.

EDITORIAL OPINION

Here we are, 30 years and $30 billion later, with a total wheat stock of 2.6 billion bushels, counting the carryover and the present harvest. That's several times the amount of wheat the U.S. needs to fill its own stomach. This has happened despite the well-intentioned—all politicians claim to be well-intentioned—but 100% impractical and impotent palliatives such as marketing quotas, acreage allotments, conservation payments and the like.

The Chicago Board of Trade, which contains within its membership a representative cross section of thinking in the grain trade, presented some thoughts and suggestions on the problem to the recent Democratic convention. And the board, it is hoped, will make them to the Republicans in Chicago also. The officials observe that "the plight of large numbers of farmers and the steady decline in farm income in recent years, is recognized by thoughtful citizens as a pre-eminent domestic problem and one that has international implications as well."

Slashing at the program of regimentation provided for by present legislation, the board says that "the farmer's well-being lies in a free and open market by which he can adjust his production to the needs of the nation and the world rather than by the administered methods of Communism."

One thing urged by the board, as a first step in cutting this modern Gordian knot, is the abandonment of the non recourse feature of the government loan program. In its place, and solely as a temporary expedient, the board suggests the making of compensatory cash payments directly to farmers during the transition back to free markets.

The present program, it is agreed by many, has been tried long enough to prove that it does not increase the income of farm families, but brings about the acquisition of further surpluses by the government with consequent cost to the taxpayer. There lies the crux of the problem which must be solved. Otherwise, where is it all going to end? «

Allieds Make New Move to Support Technologists

OFFICIALS AND MEMBERS of the Association of Operative Millers and the American Association of Cereal Chemists are unanimous in applauding the contributions made by members of the allied trades to the well-being of the two professional groups.

The allied men do this work because it is a means of creating goodwill for themselves and for the firms they represent. They know full well the advantage of good customer relations.

Allied men can be found taking office in both associations—and the jobs they take are working jobs. For instance, out of AOM's 14 districts, 10 secretaries are members of allied firms. In AACC, some important committees are headed and manned by allieds. Many of them expend effort above and beyond the call of duty and successfully complement the work the millers and chemists do for themselves.

At international conventions, the allied men provide the conviviality which is so conducive to building friendships between one miller and another, between one firm and another. Management, in turn, benefits from the knowledge men gain as a result of quiet conversations with fellow technologists.

Always ready, too, are the allied men to present technical papers on their particular specialty at the annual conferences and at the district meetings which are a regular part of the industry scene throughout the U.S. and Canada. They travel long distances, fitting in business calls where they may, in order to serve the industry by the dissemination of knowledge at the group level.

Can the allied men do more? Yes, say some of them, and they are eager to try. Sparked by the organizational enthusiasm of Donald S. Eber, AOM executive veep, in his continuing efforts to raise program standards, already higher than they have ever been in the history of the association, the allied trades committee of District 4 in Minneapolis is going into the program business.

B. Wayne Carmichael, Merck & Co., Inc., allied chairman approached district chairman George L. Tooker, Commander Larabee Milling Co., with the suggestion that the allieds be allowed to provide part of the program at the next meeting in Minneapolis Aug. 6. Mr. Tooker, an experienced program organizer himself, readily agreed.

Mr. Carmichael explained that his desire was not to put up an allied man to speak—the district officers are well able to make their own arrangements in this regard—but to provide a program the millers ordinarily would not have.

So the allied men have contracted for a movie, Washington at Work, and this will be shown Aug. 6. It will enable the millers to get a behind-the-scenes glimpse of what makes the government tick, how it influences their daily lives and, more importantly, just how extensive is government influence on private enterprise, on the very firms they serve. It will be an eye-opener and a useful adjunct to that wider education which all millers desire to have. No longer is a miller bound by the confines of the mill walls.

We applaud this allied effort. There have been similar attempts in the past, with varying degrees of success, but on this occasion the suggestion is backed by a determination to be of service. Other districts undoubtedly will match it and do better for that is the record established by AOM over the years. «

REPRINTS OF ARTICLES

The reader will observe that considerable space is devoted under the new editorial conception of The Miller to material which can be read in no other publication. Information is being made available to The Miller on an exclusive basis. Specialist writers have been engaged to prepare articles specially geared to the needs of the grain, milling and baking industries; organizations working with these trades will use The Miller as a forum for the publication of reports, views and opinions. Reprints of articles in quantity can be made available at reasonable prices. Application for quotations should be made to the Reprint Dept., THE Northwestern MILLER, P.O. Box No. 67, Minneapolis 40, Minn.

INDUSTRY RECORD . . . An Account of Trade Affairs and Events

United States

Named vice president and general manager of BAY STATE MILLING CO., Winona, Leavenworth and Boston, is PAUL B. MINER, announces BERNARD J. ROTHWELL, II, president. Formerly vice president in charge of sales, he succeeds retiring GEORGE E. KELLEY — for that story turn to page 7. New treasurer is lawyer EARLE W. CARR, Boston, succeeding another Bay State veteran M. A. LARABEE who continues as director. Also elected to the board is FRANK HUTCHINSON, former president of Lawrenceburg (Indiana) Terminal Elevator Co. Mr. Miner is a graduate of the American Institute of Baking and of the Advanced Management Program of the Harvard Business School. He joined Bay State as a salesman in 1929; before that he was engaged in the baking business.

Paul B. Miner

•

PILLSBURY CO. announced $5 million office expansion and modernization program at Minneapolis headquarters. It's linked to block-square Cargill development at same location. And the whole package combined carries a $26 million price tag. Interior of existing building slated for complete refurbishing. Big problem facing Pillsbury—stay downtown or follow the trek to the suburbs. TERRANCE HANOLD, treasurer, reports an employee study saw the dice heavily loaded in favor of staying with "the shops, restaurants, parking." And for executives advantages come from proximity to grain exchanges, financial institutions and other conglomerates of commerce.

•

Consolidation in New York sees the long established H. J. GREENBANK CO. join with the equally long established TANNER-EVANS-SINEY CORP. Brand name "Three Star Gee" merchandised by Greenbank for years —a cake and pastry flour—will be handled by Tanner firm. Concurrently, ERNEST BUCHOW of Greenbank—six decades in Metropolitan flour trade—retires. Greenbank traces its ancestry back to the firm of Pottle & Jacoby, established 1868. W. P. TANNER has been in business in the New York market for 52 years. Before that was associated with his father in flour milling.

•

GENERAL MILLS, INC. is readying announcement of details on brand new mill at Buffalo, New York. News will be out Aug. 1. Firm claims revolutionary new flour process. And some new names will break on the milling world.

•

Minneapolis merger sees the 32 year old FRANK H. HIGGINS CO. become a wholly owned subsidiary of 71-year-old ATWOOD-LARSON CO. FRANK HIGGINS is past president of Minneapolis Grain Exchange; so is J. A. BOLTON, prexy of Atwood-Larson. A-L's total worth now estimated at $4 million—combined operation services nearly 400 elevators in Upper Midwest.

•

PILLSBURY CO. announced quarterly dividend of 35¢ share on common, $1 on preferred.

•

Bills to protect U.S. bakers from what they dub unfair competition by Canadian border bakers selling cheap imported bread sitting in Congress. Aim of sponsors is to remove bread from free list under Tariff Act of 1930 and impose 30% duty. Necessary information and evidence is slow coming from bakers, and that means inaction and lack of interest by officials.

•

A landmark at Moscow, Idaho, is feeling the sting of the wrecker's hammer. Former flour mill of MARK P. MILER CO. now being torn down . . . last made flour in 1949, but was kept ready to go until last fall when the

RETIRED after 39 years of valuable service to the grain growing and processing industries of Minnesota, Montana, North and South Dakota is Henry O. Putnam, seen standing in the center of this picture. On the left is Don Fletcher of the Rust Prevention Assn., and on the right Eugene Hayden, his chief aid. The two associations are now merged as the Crop Quality Council. An editorial comment appears elsewhere in this issue.

owners, LATAH COUNTY GRAIN GROWERS, removed machinery. Mill shut down following curtailment and cessation of China flour trade at start of World War II. Miller organization founded TERMINAL FLOUR MILLS—operating now at Portland and Spokane.

•

Canada

Argentinian representatives at the recent five nation — U.S., Canada, Australia, France as well—Wheat Utilization Committee meeting in Ottawa visited CANADIAN WHEAT BOARD and BOARD OF GRAIN COMMISSIONERS in Winnipeg. Officials impressed with grain grading system and handling facilities. RAFAEL GARCIA-MATA said Argentina planning construction large interior terminals to facilitate bulk handling of producer-deliveries.

France

U.S. DEPARTMENT OF AGRICUTURE has given France's NATIONAL INSTITUTE OF AGRICULTURAL RESEARCH a $55,155 grant to support four year study of the effect of phosphorous compounds on solubility of proteins in flour.

•

Philippines

New mill at Cebu, to be built by HENRY SIMON of England, will be among most modern in the world. Will be built on a coral reef, on one of best deep water sites in the islands.

•

Brazil

ANACONDA flour mills of Sao Paulo, Brazil, HARRY L. DONOVAN, executive veep, has started up new mill at Curitiba. Machinery imported from Czechoslovakia. All spouting is of glass; cyclones made of glass, too.

•

Congo

World's newest trouble spot is a major flour importer. U.S. provided 72% in 1958, Canada 16%.

•

Viet Nam

USDA announces issuance of authorization to Viet Nam to finance the purchase of $847,000 worth of wheat flour from U.S. suppliers under Title I of Public Law 480. The authorization includes ocean transportation costs. The authorization, No. 45-04, provides for purchase of about 9,500 metric tons of wheat flour in bags. Information concerning purchasers of the flour may be obtained from the Embassy of Viet Nam, 2251 R. St. N.W., Washington 8, D.C.«

June Flour Production 19,612,777 Cwt.; Over May But Below Comparable Month Of 1959; Daily Output 891,490 Cwt.

U.S. wheat flour production showed no spectacular gains during June, although the end of the month offered some opportunity to project a measurement of first-half 1960 against the comparable period of 1959.

Indications are that the mills managed to keep total June output a shade ahead of May. However, daily grind was down, and the approach of new crop wheat and flour fostered a general reluctance to expand operations in the face of this development.

Total June output has been estimated by THE Northwestern MILLER at 19,612,777 cwt., representing a slight gain over May but somewhat below June of last year. Daily output amounted to 891,490 cwt. for the 22 working days, below both comparable previous months. May had 22 working days and June of 1959 had 21.

The total June offtake of 19,612,777 cwt. was 594,777 cwt. (3.1%) over May but 573,223 cwt. (2.8%) below June of 1959. As its official production total for May, the Bureau of the Census reported 19,018,000 cwt. It reported 20,186,000 cwt. for June of 1959.

June daily average output of 891,490 cwt. was 14,510 cwt. (1.6%) below the official census bureau figure of 906,000 cwt. and 26,510 cwt. (2.9%) below the figure of 918,000 cwt. for June of last year.

Of significance for the 1960 outlook is the fact that census bureau production totals for January through May, and the June estimate, show the current year's total output for the first six months nearly 1.4 million hundredweights ahead of the first half of 1959.

Combined six-month output for 1960, as of the end of June, stands at 122.3 million compared with the official figure of 120.9 hundredweights through the end of June, 1959. Indications are that July output may continue somewhat light, but that new crop buying will result in the traditional surge in August and a continuance of higher grind during the succeeding months.«

U. S. WHEAT FLOUR PRODUCTION JUNE, 1960

Mills reporting to THE Northwestern MILLER account for approximately 77.3% of the total U.S. flour output. Figures for Buffalo, Kansas City and Minneapolis represent 100% of production of those points in hundredweights.

Minneapolis	774,241
Interior Northwest	2,237,431
NORTHWEST	3,011,672
Kansas City	1,060,207
Interior Southwest	4,684,166
SOUTHWEST	5,744,373
BUFFALO	2,137,041
CENTRAL & SOUTHEAST	2,308,168
NORTH PACIFIC COAST	1,959,423
TOTAL	15,160,677
Adjusted	77.3
U.S. TOTAL	19,612,777
DAILY AVERAGE	891,490

Bureau of Census reported 19,018,000 sacks (906,000 daily) for May, 1960.
Bureau of Census reported 20,186,000 sacks (918,000 daily) for June, 1959.

• • •

19,018,000 Cwt. Flour Produced During May

Wheat flour production in May was 19,018,000 cwt., averaging 906,000 cwt. a working day, it has been reported by the Bureau of the Census, U.S. Department of Commerce.

This compared with an average output a working day of 921,000 cwt. in April and 965,000 cwt. in May of 1959. Wheat flour mills in May operated at 80.8% of capacity, compared with 82.2% in April and 87.4% in the previous May.

Flour mills in May ground 43,416,000 bu. wheat, compared with 44,271,000 bu. in April. Wheat offal output was 358,938 tons.

Rye flour production in May was 155,000 cwt. Rye grindings were 339,000 bu. and 1,650 tons of offal were produced.

These figures represent the production of all commercial mills in the U.S. About 97% of the totals were reported by 282 mills having a daily capacity of 401 cwt. or more and the balance estimated. The estimated portion is based on a survey of the smaller mills in 1950.«

CUMULATIVE ASH TABLES

Passage 1	% total flour 2	Tot. flour accumulated 3	% ash content 4	2x4 5	2x4 accumulated 6	Flour* ash* 7
1st middlings ...	17.37	17.37	.325	5.645	5.645	.325
2nd middlings	25.81	43.18	.335	8.646	14.291	.331
3rd middlings ...	7.45	50.63	.345	2.570	16.861	.333
4th middlings ...	6.24	56.87	.390	2.439	19.300	.339
3rd sizer	0.73	57.60	.400	0.292	19.592	.340
2nd break	4.30	61.90	.450	1.935	21.527	.348
1st sizer	0.73	62.63	4.70	0.343	21.870	.349
6th middlings ...	2.31	64.94	.470	1.086	22.956	.353
3rd grader	0.47	65.41	.475	0.223	23.179	.354
2nd sizer	1.50	66.91	.500	.750	23.929	.357
1st break	3.60	70.51	.510	1.836	25.765	.365
2nd grader	1.98	72.49	.545	1.079	26.844	.370
3rd break	3.41	75.90	.545	1.858	28.702	.378
5th middlings ...	3.38	79.28	.545	1.842	30.544	.385
7th middlings ...	2.62	81.90	.580	1.520	32.064	.392
8th middlings ...	2.50	84.40	.585	1.463	33.527	.397
4th grader	1.25	85.65	.620	.775	34.302	.400
5th grader	3.10	88.75	.635	1.969	36.271	.409
4th break	2.64	91.39	.640	1.690	37.961	.415
5th break	1.21	92.60	.690	.835	38.796	.419
Low grades	4.74	97.34	.770	3.650	42.446	.436
Tailings	1.74	99.08	.850	1.479	43.925	.443
6th grader	0.92	100.00	1.200	1.104	45.029	.450

*By dividing the results in Col. 6 by the corresponding figures shown in Col. 3 the final cumulative ash content is recorded in Col. 7.

Analytical Methods to Control

Mill Efficiency

By KONRAD WISSMAR
Maple Leaf Milling Co., Ltd.

Presented at the 65th Annual Technical Conference of the Association of Operative Millers

During the past few decades we have witnessed great progress in all fields of human endeavor. Science and research have opened up vast new vistas, and industry, as a whole, has been very adept to reap the benefits. All of us read and hear continually about the great strides taken towards greater efficiency in all branches of industry.

If we take stock of our own achievements in the flour milling industry, I think we have to admit that there is room for improvement in certain sectors. It is true that remarkable progress has been made in the field of cereal chemistry. We have certainly developed higher standards of quality since we opened the door for the mill control lab and its functions.

Konrad Wissmar

Research engineers and mill equipment designers have contributed much to keep our industry abreast of modern times. But when we take a critical look at ourselves, the mill superintendents and the head millers, can we honestly say that we have done our share in this team effort? What have "we" accomplished at our own level towards better mill performance and higher milling efficiency?

More Art Than Science

Speaking for myself, I will concede that some phases in our business of making flour from grain are still more of an art than a science. We have been cajoled for pursuing our craft in the same old way our fathers and grandfathers used to go about it.

Nevertheless, I believe it is important to have the skills and the practical know-how our mentors passed on to us when we were apprentices in the trade. I don't believe, however, that it is good enough to rely on tricks of the trade alone. Why should we argue endlessly about roll settings, purfier adjustments and sifter clothing if there are proven methods of test sieving, weighing and analyzing to settle these arguments on the basis of hard and cold facts?

Much has been said and written about methods to set up a flour mill to optimum performance. The next logical step, in my opinion, would be to look for a method by which to analyze and evaluate the performance of a mill and to arrive at some measure of efficiency.

From a variety of methods I have chosen two which in my own practical experience have proven to be most helpful. These are the cumulative ash curve and the divide curve.

The reason for making this particular selection may be briefly explained:

After a mill has been "set up" and is operating at what is thought to be maximum efficiency, the "cumulative ash curve" method is employed to prove or disprove this assumption. When proof of top performance is established, the next problem is how to reap the benefits, in other words, how to make the most profitable flour divides. The answers to this problem can be found with the "divide curve" method. Because it is based on the cumulative ash curve, the miller can determine precisely where flour divides or any combination of divides can be taken off without sacrifice of quality and quantity. The divide curve is also a valuable measure of efficiency; if the actual divides fall short of the standards established by the divide curve, the miller will have to realize that he is operating at a loss and that corrective action must be taken.

Many years ago when Professor Mohs first compiled his "Ash Tables" it was soon realized that his basic system could easily be adapted to tabulate the results found under actual milling conditions. Of a number of variations, one method emerged and

became known as the "cumulative ash curve."

A complete set of ash tables includes all mill passages; flour and offal streams alike. However, for all practical purposes, the offal streams can be omitted and so restrict the sampling to the flour passages. If an indication of the percentage of flour extraction is desired, it can be very closely calculated from the amount of wheat weighed to the first break and the grand total of weights of all flour samples. If, for example, the wheat scale to first break is set at 60,000 lb. per hour during the time the flour samples are taken, and the grand total of all samples is 45,000 lb. per hour, the flour extraction is calculated as 75%.

When the weighed quantities and ash contents of all flour streams are recorded, the results must then be arranged in the order of ash contents. Commencing with the lowest ash stream, the data is tabulated as shown in the tables on page 11.

In Col. 1 with the heading "Passage," all flour streams are recorded in the order of ash content. The percentage of ash content is recorded under Col. 4. For example, first middlings flour with an ash of .325% is the starting point for the tabulation. Second middlings with an ash of .335% takes second place, and so on. The corresponding percentages of total flour are recorded in Col. 2. In Col. 3 these percentages are accumulated in the following manner:

First middlings with 17.37% of total flour as recorded in Col. 2 is again the starting point for Col. 3.

Second middlings which contributes 25.81 to the total flour is added to first middlings and the sum (17.37 plus 25.81 = 43.18) is entered in Col. 3. Similarly, all other passages are accumulated and, of course, must total 100% in the end. In order to find the final accumulated flour ash, as recorded in Col. 7, two steps are necessary:

- The percent of total flour, recorded in Col. 2 must be mulitiplied by the corresponding percent of ash content in Col. 4 and the result entered in Col. 5.
- In Col. 6 the results from Col. 5 must be accumulated.

By dividing the results in Col. 6 by the corresponding figures shown in Col. 3 the final cumulative ash content is recorded in Col. 7.

The first middlings stream, for example, shows an ash content of .325% in Col. 4 and, being the starting point of the tabulation with no other streams added to it, shows the same ash in Col. 7.

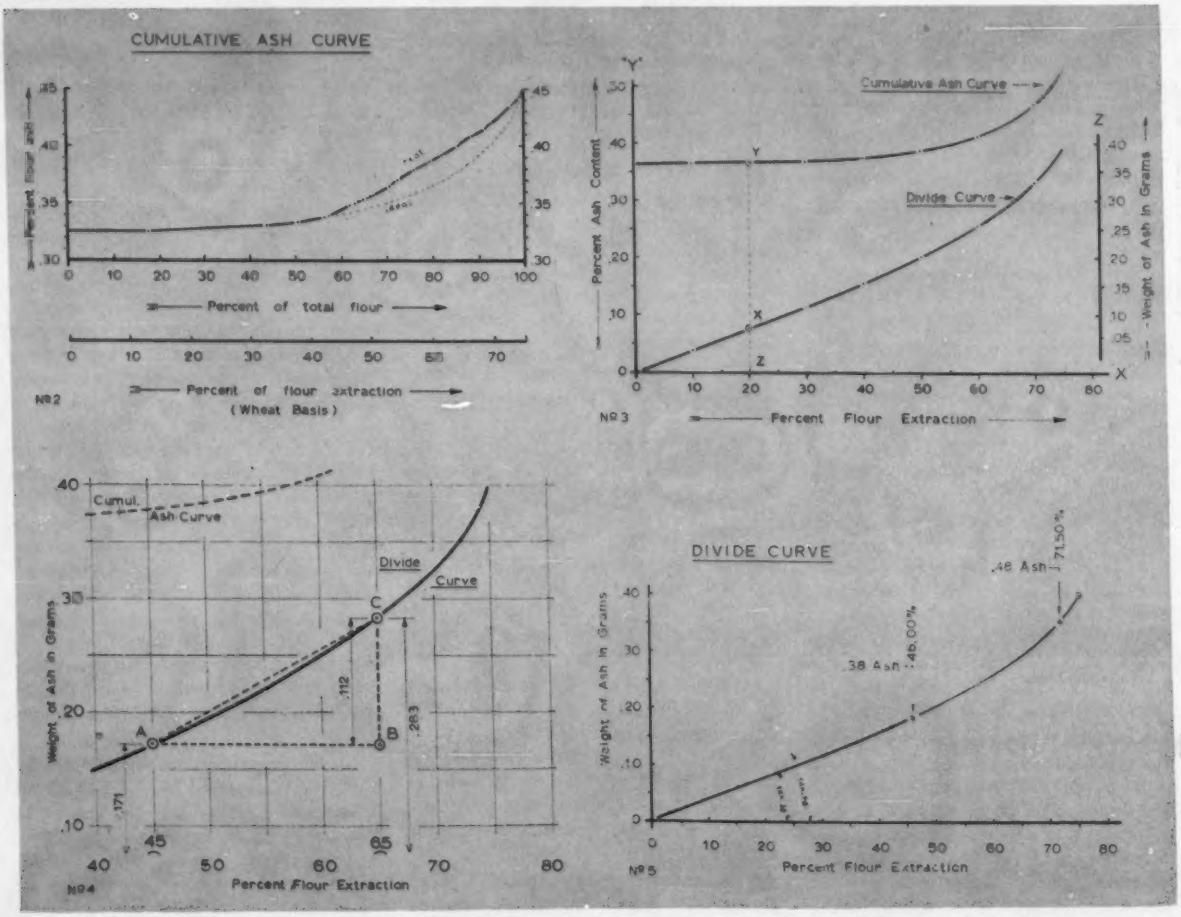
Slight Rise Noted

Second middlings which contribute 25.81% of flour with an ash of .335% will, of course, cause the ash of the combined streams to rise slightly. By adding second middlings flour to first middlings flour the ash then has risen from .325% to .331%.

The last entry in the tables shows the cumulative ash of all flour streams as .450%.

The cumulative ash tables not only record all flour streams by quantities and ash contents but will also tell at a glance the accumulated ash of any combination of flour streams from 0 to 100%. The very same information can be readily taken off the cumulative ash curve in Fig. 2.

As a matter of preference, either one of the two percentage scales can be used. The scale marked "Percent of Total Flour" is based on the very



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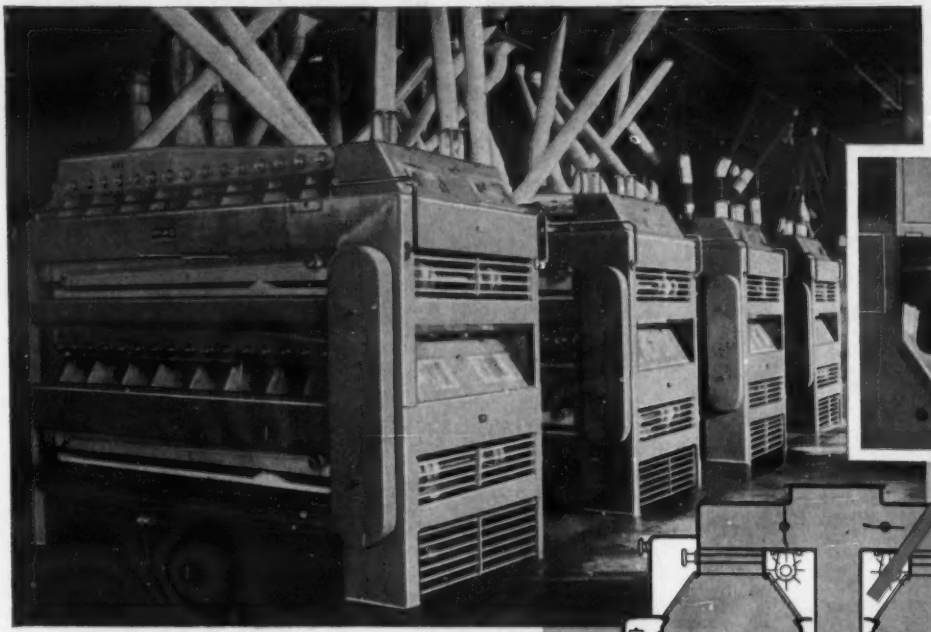

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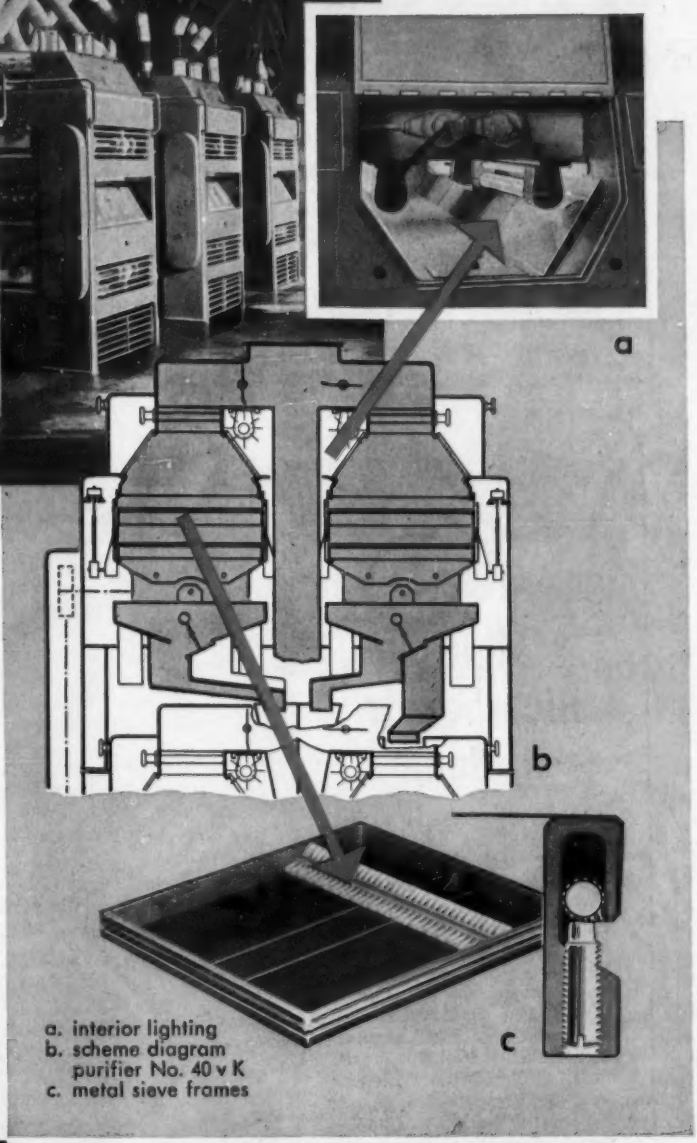

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Controlling Mill Efficiency (continued)

common practice of regarding the total flour extraction as 100%.

If a measure of efficiency is desired, the percentage scale can be calibrated to measure percent of flour extraction on wheat basis as illustrated on the lower scale.

'Low Ash Mill'

Incidentally, the data shown in these tables was compiled in a mill known as a "Low Ash Mill." The operator of this mill was very proud of his claim that he could take off 70% top patent flour with an ash of .36%.

This rather questionable claim turned out to be correct. However, upon analyzing the complete set of flour streams it also became evident that there was still room for improvement.

The cumulative ash curve in Fig. 2 reveals that the miller was concentrating on the highest possible extraction of top patent flour. Rise of the cumulative ash curve is fairly smooth up to the half way mark on the extraction scale. From there on a sharp rise of the ash curve is noticeable and many minor irregularities become evident throughout the remainder of the curve.

The obvious conclusion is that the operator was pressing too hard for a high extraction of top patent flour and did not care too much how this procedure affected the lower or tail-end passages in the mill flow.

Insofar as single divides anywhere between 0 and 100% are concerned, the necessary data is provided in the cumulative ash curve. Where intermediate divides or combinations of several divides are examined, data regarding percentages and ash contents cannot be obtained from the cumulative ash curve without considerable calculations on the trial and error basis. It is here where the divide curve comes into its own.

Fundamentals of the divide curve method were originally devised by Dr. Tarabiono of Italy. In its original form the method is based on the ash tables and ash curves by Professor Mohs. It serves two purposes:

- To determine the ash contents of flour divides of predetermined percentages.
- To determine the percentages of flour divides at fixed ash levels.

Fig. 3 shows a version based on a cumulative ash curve which was established under actual milling conditions in a "high ash" mill.

Points to Remember

Although the basic scale from the cumulative ash curve is used, again the following points must be kept in mind:

- The base line or "X" axis is calibrated to measure the percent of flour based on extraction from wheat to the first break rolls. This scale was chosen in order to retain a measure of efficiency. Both the cumulative ash curve and the divide curve are based on 75% flour extraction. If preferred, the flour extraction can be regarded as 100% total flour. In that case the figures for the flour divides in the following charts must be divided by 75 and multiplied by 100 in order to convert to 100% flour basis.
- The vertical scale on the left-hand margin or "Y" axis is calibrated to scale the percent of ash content for the cumulative ash curve.
- The "Z" axis on the right-hand margin indicates the actual weight of ash in grams for the divide curve.

It should be noted that equal units of mensuration must be used on both the horizontal and vertical axis. The distance from 0 to 10% flour extraction on the "X" axis must equal the distance from 0 to 10% of ash content on the "Y" axis and 0 to 0.10 grams of ash on the "Z" axis. The cumulative ash curve starts with the lowest ash stream at .365% and the gradual rise of the curve is a function of the flour extraction scale. The divide curve which is based on weight of ash in grams must logically start at 0.

The method of calculation of plot-points for the divide curve is shown on Fig. 3 in the following example:

The portion of flour from 0 to 20% as indicated at point "Z" shows an ash content of .37% on the cumulative ash curve in point "Y." The actual weight of ash in 20 grams of that flour extracted from 100 grams of wheat is $\frac{20 \times .37}{100} = .074$ grams and thereby fixes point "X" as one of the plot-points for the divide curve.

All other plot-points are calculated on the same basis. It is adequate to calculate plot-points for every 10% on the extraction scale. $\frac{30 \times .37}{100} = .111$; $\frac{40 \times .375}{100} = .150$, etc.

Basic Theory

For explaining the basic theory of the divide curve a portion of Fig. 3 is shown on a blown up scale in Fig. 4. Points "A" and "C" on the divide

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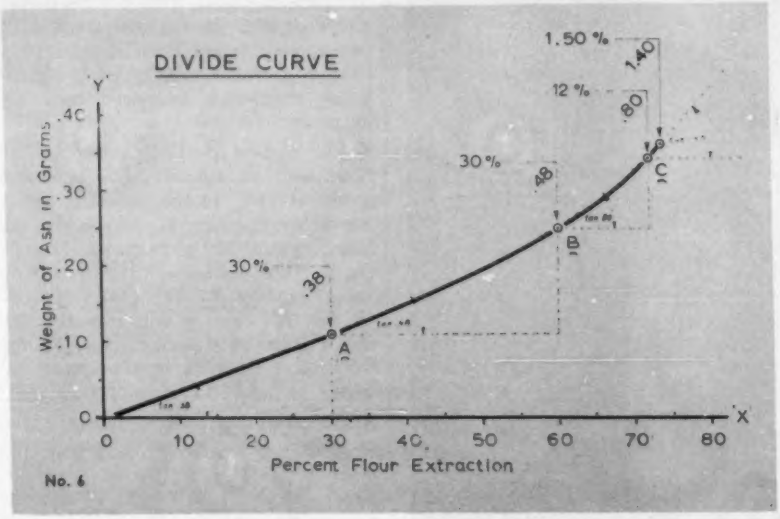
curve at 45% and 65% flour extraction are connected by a straight line. A line drawn through point "A" parallel to the "X" axis and another line drawn through point "C" parallel to the "Y" axis intersect at point "B," forming a triangle with 90° angle at "B."

If, as stated for the cumulative ash curve, its rise is a function of the flour extraction, then the angle enclosed by "AC" and "AB" must have a direct bearing on the ash content of the flour divide between 45 and 65%.

The angle at "A" is a trigonometrical function of $\frac{BC.}{AB}$ The distance AB, as indicated on the extraction scale is 65—45 = 20. The values for point "A" and "C" can either be taken off the divide curve or be calculated. The cumulative ash at 45% extraction is .38%; $\frac{45 \times .38}{100} = .171$ and thereby fixes point "A." The cumulative ash at 65% extraction is .435%; $\frac{65 \times .435}{100} = .283$ which establishes point "C." The difference .283—.117 = .112 fixes the distance CB.

According to one of the laws of trigonometry, the angle CAB is a function of the distances CB and AB. The tangent of this angle equals



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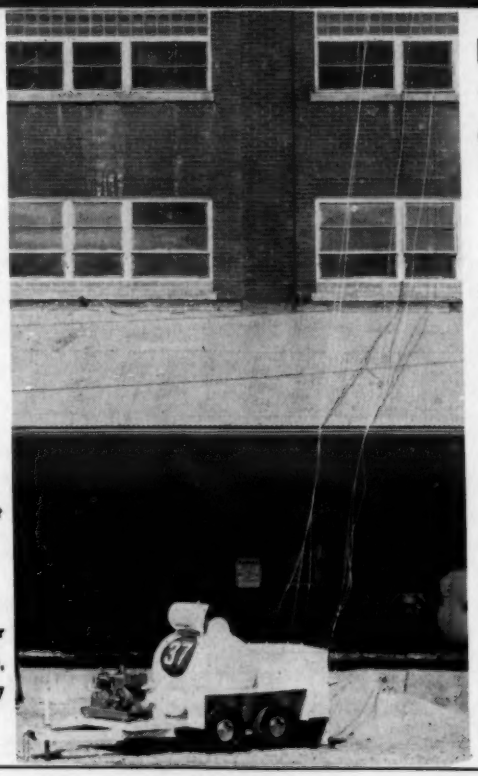

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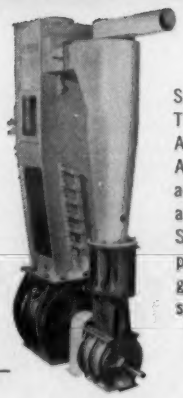

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$\frac{CB}{AB}$. The enclosed angle at "A" determines the rise of ash in the divide curve from 45% to 65%. The actual ash of this divide is: tan a = $\frac{CB}{AB}$ = $\frac{100 \times .112}{65-45}$ = .56%.

In general, it can be stated that the tangent of the angle enclosed by AC and AB in "any" part of the divide curve determines the ash content of the corresponding flour divides.

In Fig. 5 the validity of the foregoing conclusion is proven on two examples:

- The highest possible extraction of flour with an ash of .38% is established at 46% in the cumulative ash curve on Fig. 3. If, as shown on Fig. 5, a straight line is drawn through the 0 point at the angle corresponding to tangent .38 (20°—48′) parallel to the "X" axis, it will intersect the divide curve at a point directly in line with the 46% mark on the extraction scale.
- Similarly, the corresponding angle of tangent .48 is projected and intersects the divide curve at 71.50%; again the same point as previously established in the cumulative ash curve for this divide.

In Fig. 6 the following problem is examined:

If 30% patent grade with an ash of .38% shall be taken off, how much of the remainder can be packed as an intermediate grade with .48% ash; how much of the balance can be drawn at .80% ash, and how much of the final balance will be fit to make a flour with an ash of 1.40%?

Commencing with the top patent grade, point "A" is fixed at 30% flour extraction. In the next step point "B" is found by projecting the angle corresponding to tangent .48 through point "A" parallel to the "X" axis. This line will intersect the divide curve at 60% extraction. By drawing a similar line through point "B" at the angle corresponding to tangent .80, point "C" is established at 72% extraction. In the last step, the angle corresponding to tangent 1.40 is drawn through point "C" and intersects the divide curve at 73.5%.

The answers to the problems are therefore:

- Patent—.38% Ash = 30% extraction = 40.82% on 100% flour basis.
- Intermediate .48% ash = 60—30 = 30% = 40.82% on 100% flour basis.
- 1st clears .80% ash = 72—60 = 12% = 16.32% on 100% flour basis.
- 2nd clears 1.40% ash = 73.5—

72 = 1.50 = 2.04% on 100% flour basis.

Since the flour extraction is based on 75% flour from wheat to first break, the remainder, in this case 75−73.5 = 1.50%, is unfit for the divides chosen in the foregoing example.

If the percentage of top patent were reduced by about 2%, all points on the divide curve would be moved proportionately towards the left of the extraction scale. That means slightly lower percentages for the three top divides, but also means that the 1.50% of flour left over as unfit for the originally chosen divides would now be included in the clears grade. «

Stem Rust Appears; Late Stands Appear To Be Hit Hardest

Wheat stem rust is now present in Minnesota, North Dakota and South Dakota, Donald G. Fletcher, executive secretary of the Crop Quality Council has reported. The over-all condition of small grains is excellent with good yields in prospect, he stated.

Stem rust is light, thus far, except on occasional late maturing fields of winter wheat in southern South Dakota. Some of these late fields will be damaged by rust.

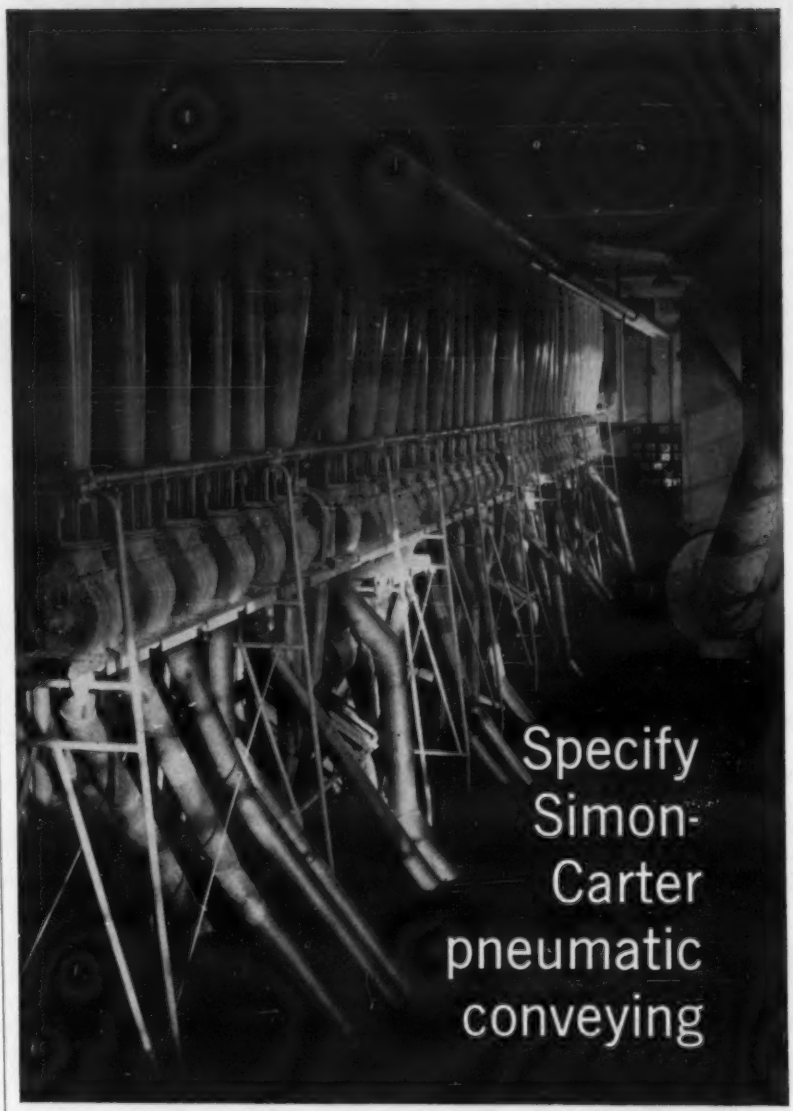
More stem rust than usual is present in Kansas and Nebraska this year. Evidence indicates that much of this rust is of a type which does not attack the widely grown Selkirk wheat or the new durums in the spring wheat area. Stem rust caused material damage to late maturing wheat in parts of Kansas and Nebraska.

Wheat leaf rust is present over wide areas of the Upper Midwest, but is generally light, Mr. Fletcher reported. Traces of crown rust are present on oats in parts of Minnesota and South Dakota, but oat stem rust has not yet been found.

Cereal crops are later than normal over wide areas of the Upper Midwest and Canada and will be exposed to air-borne rust attacks longer than usual this year. No prediction of the final outcome is possible at this time, Mr. Fletcher added. «

CHARTER GRANTED

The Elk City (Okla.) Grain & Storage Co. has been granted a 50-year charter. Capital stock is listed at $25,000. Incorporators are Huff Kelly, Gordon Galloway and F. H. Whitney, all of Elk City. «



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MEN GOING PLACES

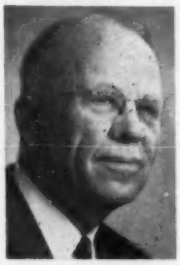
Gerald Dunne

The starch and chemical division of Ogilvie Flour Mills Co., Ltd., from now on will be the responsibility of Gerald J. Dunne, who has been appointed as its general manager. He's a graduate of McGill University, a chemical engineer, and has had quite a number of years gaining management experience in the areas of production and sales with the pharmaceutical industry. The new general manager will be located at Ogilvie's head office in Montreal, where the division which he has been appointed to head handles the company's starch, gluten, monosodium glutamate and related operations.

Fisher Flouring Mills Co., Seattle, has advanced some of its time-tested veterans to positions of additional responsibility. Harold A. Herzog, formerly superintendent of the warehouse, now is manager of research and promotion. His successor is Kenneth Mead, formerly warehouse foreman. Ray Haughton replaces Mr. Mead as foreman. The trio has a combined total of 94 years of company service—Mr. Herzog 34 years, Mr. Mead 32 years and Mr. Haughton 28 years. Fisher also has named Harry Gulin as purchasing agent, succeeding Thomas Wood, who retires after 39 years of tenure. John B. Hashagen, formerly of Chicago, is a new staff appointment. An engineer, he will supervise maintenance, replacement and new equipment installations at the Seattle mill under Dewey Robbins, general superintendent.

Sheldon Johnson, treasurer of Fruen Milling Co., Minneapolis, since 1941, has been moved up to the company presidency, while Arthur B. Fruen, president since 1923, becomes board chairman. Mr. Fruen has passed the half century mark with the firm, and in his 37 years as president, guided it to a position as one of the most diversified milling operations in the U.S. Rounding out its top level management, the company has named Roger A. Fruen as secretary and Richard W. Fruen as a director. George C. Anderson continues as vice president. A. Bruce Fruen becomes treasurer.

Sheldon Johnson



Arthur B. Fruen

Four men have received new assignments in the grocery products division of General Mills, Inc. J. M. Coleman is now western sales manager (Sperry and Southwest regions) and coordinator of sales administration. G. W. Ryan has been named central sales manager and will be responsible for sales in the division's east central, north central and Canadian territories. As eastern sales manager, GMI has appointed A. T. Kane. He will be in charge of the division's Atlantic and southeastern regions. G. W. Forster becomes assistant sales administrator and coordinator of specialty sales, which includes the company's O'Celo sponge products and pet foods.

Flo-Tronics, Inc., Minneapolis, has diversified its base of operations by a merger with Wilcox Products Co., another Minneapolis firm. Flo-Tronics, which was formed six months ago, now has a third division as a result of the merger, explained William P. Edmunds, president, in a statement issued jointly with the president of Wilcox, Earl W. Nelson. Under the new arrangement, which was based on an exchange of stock, Wilcox becomes an operating division of Flo-Tronics, with Mr. Nelson continuing to head this operation as vice president and general manager. Flo-Tronics now will supply the precision plastics parts manufactured by Wilcox in addition to its electronic controls and pneumatic conveying businesses. Wilcox Products, which supplies the electronics industry across the U.S. and Canada, now gains access to additional working capital for its expanding business, an arrangement considered mutually beneficial to both companies. «

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THE NEW YORK STOCK EXCHANGE

Quotations on baking, milling and allied stocks listed on the New York Stock Exchange:

	—1960— High	Low	July 11 1960 Close	July 18 1960 Close
Allied Mills, Inc.	39½	32	35	34½
Allis-Chalmers	40	27¾	28⅜	27¾
American Cyanamid	59⅝	47⅛	57¾	54⅞
Archer-Daniels-Midland Co.	40¼	32½	33⅛	33⅜
Dow Chemical	99⅝	85	89⅛	85
General Mills, Inc.	31	23⅞	28⅛	27½
Merck & Co.	96½	73	89⅜	85⅝
Monsanto Chemical Co.	55⅞	38⅝	43¼	41½
Pfizer, Chas.	38¼	26⅜	32¾	32½
Pillsbury Co.	39½	31⅝	35⅜	34¾
Quaker Oats Co.	50½	42	50¼	49¾
St. Regis Paper Co.	55½	35½	38	37¼
Pfd. $4.40	93	88	....	91½
Standard Brands, Inc.	49⅝	35⅛	46⅜	46⅝
Sterling Drug	66½	44½	63¼	58⅜
Sunshine Biscuits, Inc.	93¾	85	90	91
United Biscuit of America	39⅜	24	36⅝	36¼
Ward Baking Co.	15¾	11½	11¾	11½
Ward Baking Co., $5.50 Pfd.	89½	84¾	85	85
West Virginia Pulp & Paper Co.	56¾	39	44⅜	40¾

Stocks not traded:

	Bid	Asked
Allis-Chalmers, $3.25 Pfd.	100½	109
Continental Baking Co., $5.50 Pfd.	102	103
Corn Products Refining Co., $7 Pfd.	88	95
Cream of Wheat	35	36
National Biscuit Co., $7 Pfd.	153	155
Pfizer, Chas., Pfd.	96¾	99½
Pillsbury Co., $4 Pfd.	93½	95½
Quaker Oats, $8 Pfd.	130	131
United Biscuit of America, $4.50 Pfd.	92½	104
West Virginia Pulp & Paper Co., Pfd.	95	96

CANADIAN STOCKS

	—1960— High	Low	June 30 1960 Close	July 8 1960 Close
Canada Bread	3.75	3.50	3.75	3.75
Canada Bread, Pfd. B	52	52	....	52
Can. Bakeries	6¼	6	....	6
Can. Food Prod.	4.50	3.10	3.75	3.75
Can. Food Prod., A	10	6½	....	8½
Can. Food Prod., Pfd.	66	45⅛	60	61¼
Catelli Food, A	40	38	....	39½
Cons. Bakeries	9	8	*7¾	8
Dover Ind.	13½	11½	....	11½
Dover Ind., Pfd.	9	9	....	9
Federal Grain	48	39	42¾	43½
Federal Grain, Pfd.	27½	25½	....	26⅜
General Bakeries	9	7	7½	7⅛
Lake of the Woods, Pfd.	130⅝	114	....	130⅝
Maple Leaf Mlg.	14½	11¼	13	12¾
Maple Leaf Mlg., Pfd.	89	85	*90	*89½
McCabe Grain	33	32	....	32
Ogilvie Flour	46½	40	42	42
Ogilvie Flour, Pfd.	140	125	130	130½
Standard Brands	39½	37¼	....	39½
Toronto Elevators	13	9	10½	9¼
United Grain, A	15⅝	15½	15⅝	15⅝
Weston, G., A	35	29	34¾	35
Weston, G., B	36¼	28½	35	36½
Weston, G., Pfd. 4½%	87	82	86	*89

*Less than board lot.

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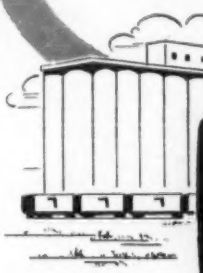

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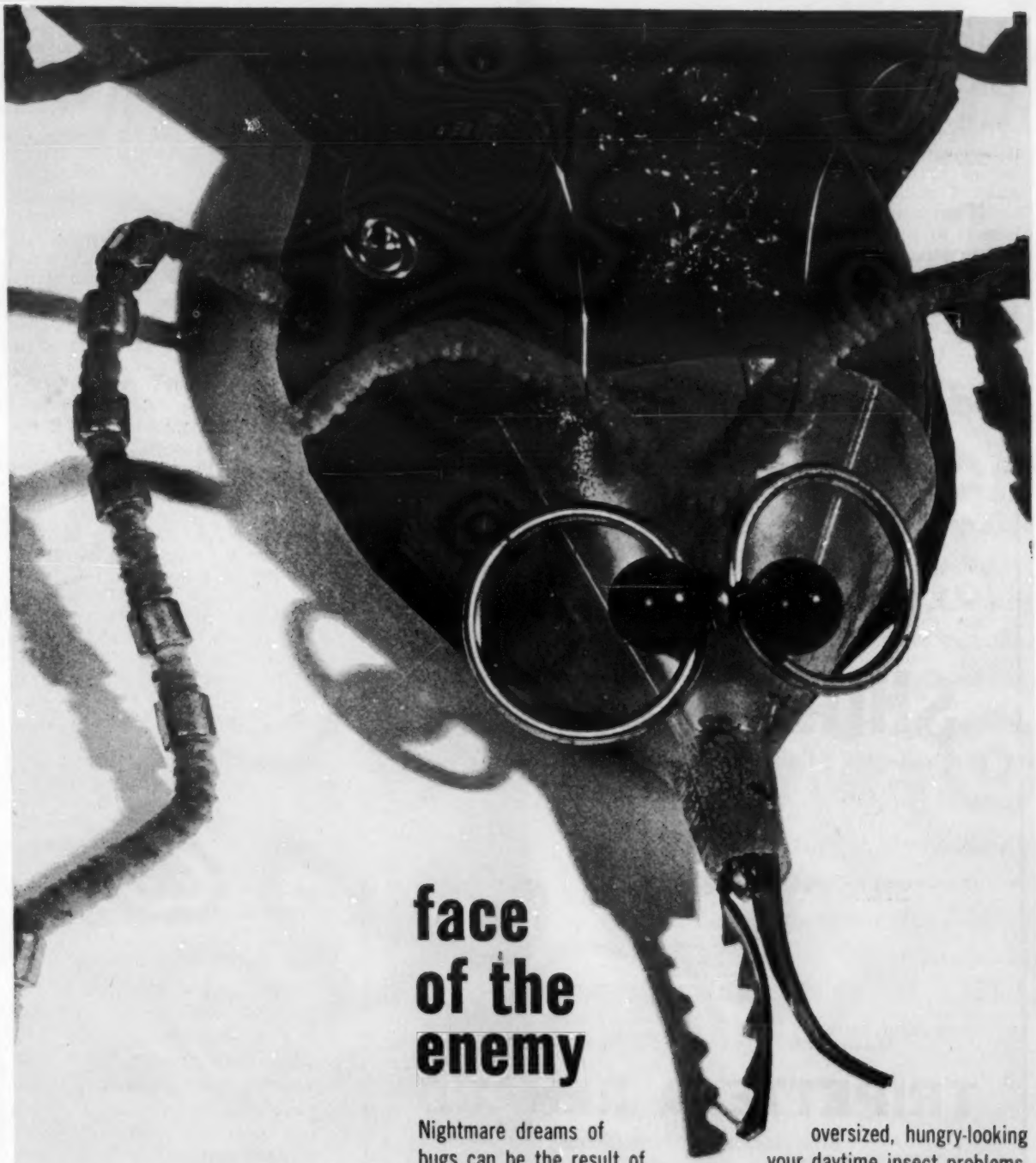

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There's a pair of rugged young millers over in the corn country of eastern Iowa convinced they could make a million if the government would just keep its paws off and allow farmers to grow enough good wheat in their area!

Vernon and Norman Brumwell—folks call them Grumpy and Doc—work their fingernails to the elbows grinding, packing, selling and fixing the machinery when it boggles down. They grind everything from wheat to corn and a lot of interesting things in between.

They learned milling as kids some 16 years ago when their father purchased the mill and began to mill corn. For the last three years, since they bought the business from their dad, the boys have been organized as the Brumwell Milling Co.

So far they have 10 of their own products, including three pancake mixes, packaged whole wheat and graham flour, some rye and rye meal, even cracked wheat, rolled and whole kernel wheat. Like all top individualists, the fellows use their own secret formulas.

"But government regulations just don't allow farmers around here to raise enough of the wheat we want for our specialty products," the brothers complain. With all the government restrictions they find it requires a strong constitution to run their business these days.

Grumpy and Doc figure it'll take another 10 to 20 years to get their operation on the paying basis they would like to see. Actually, they admit to having come a long way up the ladder of success in just three years.

So, to keep the wolf from kicking down the door while the business grows, the Brumwell brothers supplement their income by playing in dance bands and doing a little house painting in the summertime.

They grind on a hammer mill or a roller mill, as called for, then package their own products and set out on any one of eight different sales routes which cover a radius of 100 miles from their mill.

Power for the mill is supplied by a gasoline engine. They dry their rolled wheat on trays exposed to sunlight. «

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New Hard Red Wheat

Tascosa, a new hard red winter wheat seed which derives its name from a frontier settlement on the Panhandle west of Amarillo, Texas, will be available from producers of certified seed after the 1960 harvest.

The variety was developed by the small grains section of the Texas Agricultural Experiment Station in cooperation with the U.S. Department of Agriculture.

Tests on the Rolling Plains show Tascosa ranking first in yield. In regional trials in 61 station-year tests, Tascosa averaged 33.7 bu. an acre over a four year period, compared with 33.3 bu. for Concho and 31.4 bu. for Comanche. The new variety has not yielded as well as Crockett in north central or central Texas tests. Because of this and its susceptibility to certain diseases, it is not recommended for these areas. «

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SPOTLIGHT on WASHINGTON

By John Cipperly

DUTCH FLOUR TRADE is threatened again. Pressured by the Dutch millers, the Ministry of Agriculture may attempt to eliminate or at best curtail the quota of 75,000 tons of flour allowed to enter the country duty free every year. Anything over that pays 3% ad valorem. But not all this flour comes from the U.S. Other foreign export mills can participate though U.S. gets the lion's share.

☆

U.S. assistant secretary of agriculture Clarence L. Miller has received the message—American flour interests object. And he in turn will be asked to retaliate by cutting concessions Dutch have for their cheeses, bulbs and other products sold in the U.S.

☆

Sparking the protest are the members of the National Association of Flour Distributors who discussed the matter at their recent annual meeting. Energetic chairman of the committee behind the move is veteran flour man, W. P. Tanner, Tanner-Evans-Siney Corp. of New York.

☆

GOVERNMENT OFFICIALS, commenting on the protest to Mr. Miller, tend to take a dim view of the flour export outlook even for such an established market as Holland. The situation, they say, is complicated by uncertainties arising from the European common market program for agricultural imports and their products.

☆

But the pessimists have not reckoned with the tenacity of the Dutch flour importers, or with the acknowledged policy of the Netherlands government to allow imports to avoid the evils of monopoly. Such a monopoly arises in any country when imports are barred, often with disastrous consequences, pricewise and quality-wise.

☆

OUTLOOK FOR EXPORT BUSINESS in the myriad new republics now mushrooming around the globe is far from clear. Government men do not mean to convey that there will be an abrupt end to flour exports—the sort of abruptness which might characterize the Dutch situation—but they feel that there will be a gradual erosion of business as self-sufficiency is attained. They say the flour millers will have to face this fact.

☆

Flour millers do face the fact, and are stepping up their efforts to hold what business there is by active market promotional efforts. And where the chances to participate in milling abroad arise, they are participating to the full extent of their resources—either by outright ownership and construction, or by leasing new mills. This is particularly true in the Central and South American areas.

☆

COMMODITY STABILIZATION SERVICE officials aren't scared at trade reports that storage space is short for the take-over of new crop deliveries. On the other hand, they were surprised at the rapidity marking the pick-up of empty space, but claim this is a regional rather than a national factor.

☆

Considerable quantities of Commodity Credit Corp. bin storage facilities have been made available. If an acute shortage develops in the wheat and small grain production areas, CCC will provide loans for grain stored on the ground until storage opens up.

☆

Areas where tightness may develop are the very ones where on-the-ground storage is not hazardous. So producers won't be denied use of the loan programs because of a storage deficiency.

☆

RETURN OF CONGRESS in August will provide a chance to re-open farm legislation, if for no other reason than to provide the political parties with an issue to take to the farm belt in the election campaign.

☆

The Democratic farm plank, now firmly nailed down, is strangely reminiscent of the Eisenhower statement at Kasson, Minn. in 1952. He pledged parity goals for farmers and the Democrats are now singing just about the same tune, but in a different key. But they only hum the

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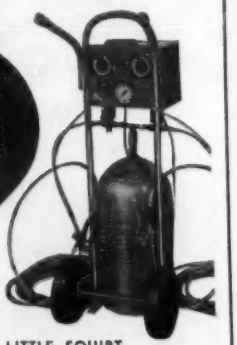

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words when it comes to detailing methods on how they will achieve the goal.

☆

Fragmentary information seems to indicate that the Kennedy-Johnson ticket may be drawing on farm economists of the liberal wing in pounding out their farm proposals.

☆

STILL PENDING before the House is the Senate-passed bill calling for a 20% reduction in acreage and support at not less than 75% of parity. When the House debated its own bill—rejected—an amendment to the bill similar to the Senate bill also went down to defeat.

☆

Assuredly, the leaders of the Democratic ticket see the renewed session of Congress as a golden opportunity to re-open the farm issue and obtain something to take to the farm belt. With the ticket in full command of Congress, the Democrats will be faced with the necessity of making good on the party farm pledge. It looks like put up or shut up.

☆

WHICH EVER WAY YOU LOOK there are no indications of new views or methods on the horizon. Whatever is done will be the same old patent medicine which the old farm bloc always used to control the farm vote. The question is can the Kennedy-Johnson leadership restore the cohesion of the farm bloc groups which have not only lost their monolithic solidarity, but prior to the congressional recess, gave evidence of internecine warfare. And fighting among themselves is sure to continue. «

John Rich Retires–Again

Retiring is getting to be a habit with the energetic John Rich, milling superintendent for F. W. Stock & Sons, Inc., Hillsdale, Mich. He's already tried it twice, and with a record of more than half a century in the business.

Mr. Rich was honored at the Hillsdale Country Club on the occasion of his second retirement, this time from F. W. Stock & Sons, which is a division of DCA Food Industries, where he served four years. Previously, he retired from Commander Larabee Milling Co., at Kansas City, in 1953, with a lond record of service behind him. Though retired again, Mr. Rich will remain available to F. W. Stock on a consulting basis.

"This time it's for good," says Mr. Rich—"I plan to raise tomatoes and do some fishing. His successor is Marvin Jackson, transferred from DCA at Ellicott City, Md. «

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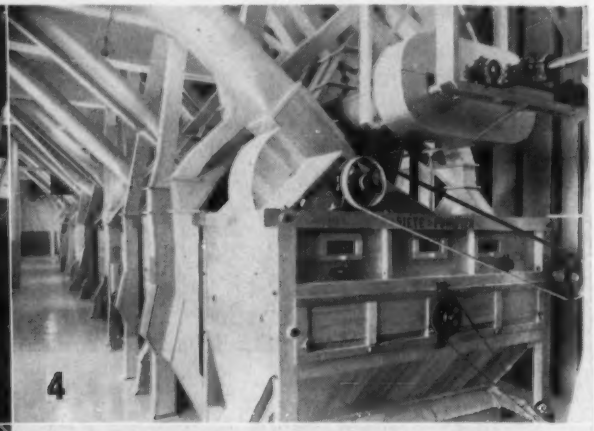
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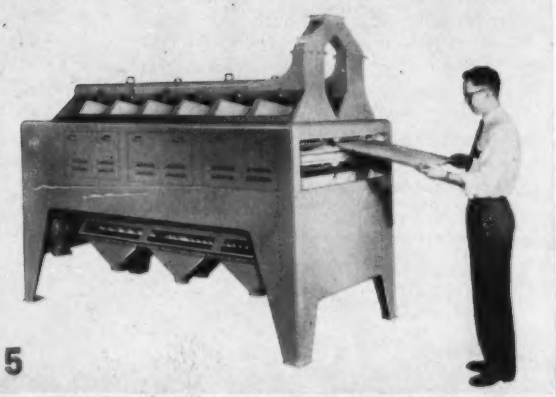
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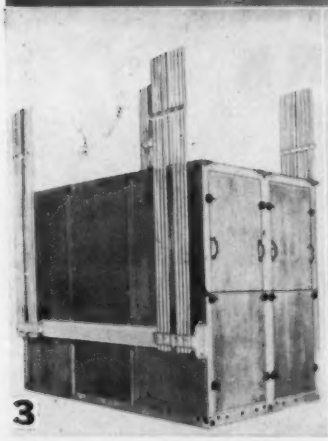
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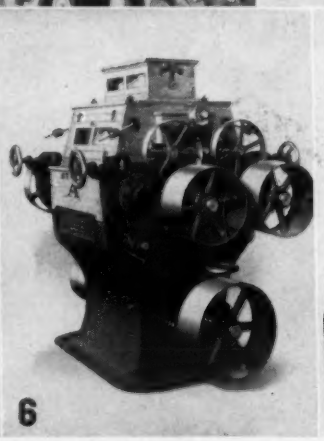
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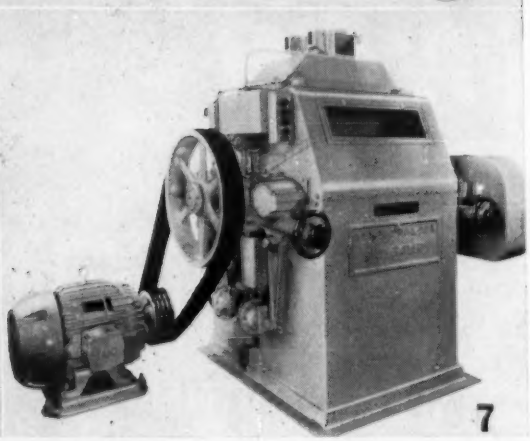
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MILLING MACHINERY TODAY not only performs its job more efficiently than in Grandad's day—it also looks better. Allis-Chalmers Manufacturing Co. has supplied the accompanying photos of milling machinery "as it was" and in the gleaming, streamlined shapes and sizes currently in use. Photos 1, 2 and 3 show the evolution of sifters, starting, respectively, with the old centrifugal reels, then moving on into the universal bolter, and finally to its present free-swinging sifter. Nos. 4 and 5 illustrate the old Nordyke sieve purifier, of wood construction, and the recently redesigned, 40 in. by 72 in. divided, double-deck purifier of all-metal construction. Nos. 6 and 7 show an old Allis roller mill with a cast Mae West base and wooden feed housing contrasted with the latest roller mill, the "AirSet," which lends itself toward automation through use of pneumatic roll loading and remote operation.

What should a baker expect from his flour supplier?

THREE THINGS: experience, integrity, ability. Your flour supplier should have all three. How does Russell-Miller measure up?

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And not only does Russell-Miller have this greater experience in flour production, the men who call on you have a record of experience unmatched by any other milling company. The average length of service of our sales representatives is *18* years. These men have dedicated their entire lives to the flour business.

Integrity? This is the most important quality. It is integrity that leads a company to serve you honestly and energetically. It is the kind of quality that prompts bakers to rely on Russell-Miller Flours when they bake experimentally to set standards for their line.

It is the kind of moral responsibility that prompts Russell-Miller to maintain stringent quality control, to make sure that an inferior product never leaves our mills.

It is the kind of moral responsibility that prompts us to support major crop improvement associations—in an effort to make sure the best possible wheat is being grown for your flour.

And what about ability? This is the factor that makes it possible for an experienced and morally responsible miller to really *do* something constructive to help bakers.

Russell-Miller *has* the capacity to make effective contributions to baking. We are one of the world's largest milling companies, with elevators and mills strategically located in the best wheat areas. We have available to us one of the world's greatest storage capacities; we have ready-at-hand at all times just the right wheats you need for your flours.

Russell-Miller has the resources to maintain the very latest milling machinery and methods, to assure you just the right flour. And these resources enable us to send specialists every year into the heart of the wheat growing areas in advance of the harvest to collect wheat samples which are experimentally milled. Result? We know exactly which wheat to buy for the exact type and quality of flour you need.

What should a baker expect from his flour supplier? Experience, integrity, ability. The next time you order flour, check off these qualities in your mind. Then ask yourself if your flour supplier measures up to Russell-Miller.

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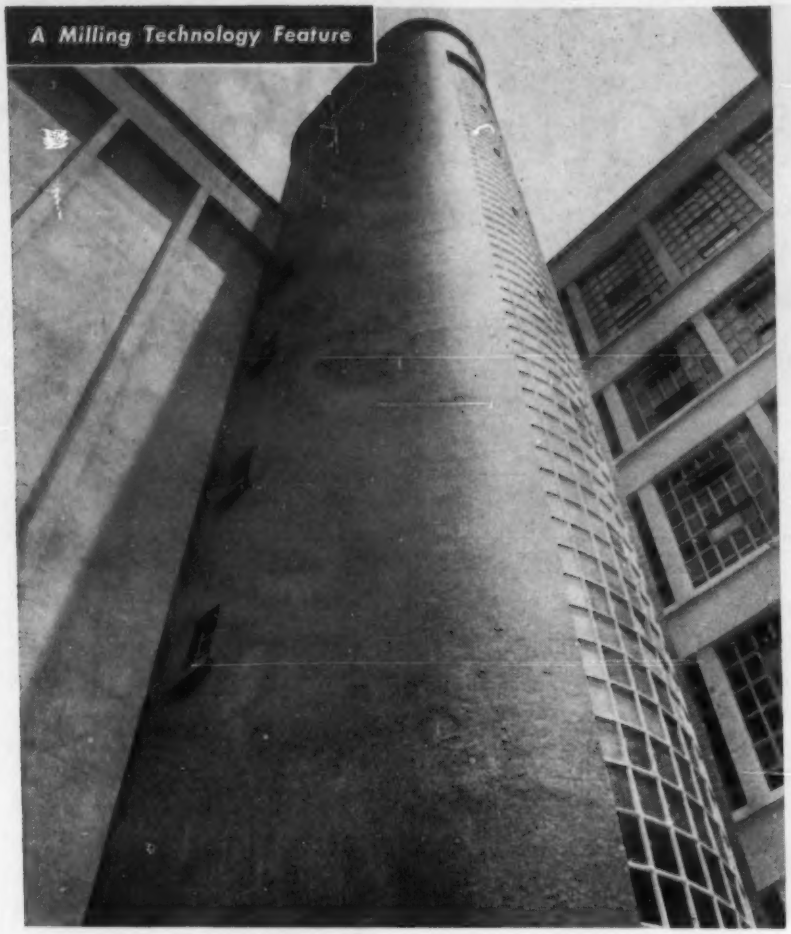

The basic purposes for milling have remained the same since time immemorial, but there is a note of excitement ringing out toward the future. Dr. Shellenberger, head of the Department of Flour and Feed Milling Industries, Kansas State University, Manhattan, expresses appreciation for the many helpful suggestions for his material received from persons prominent in the milling industry at home and abroad. Dr. Shellenberger's paper was presented before the annual meeting of the American Association of Cereal Chemists held in Chicago.

The Exciting Face of Change in Milling

By DR. J. A. SHELLENBERGER

It is often contended by the uninformed that the flour milling industry has remained relatively static through the years because the milling process has not been superseded by other manufacturing enterprises nor undergone radical change to arouse common interest—such as replacement of coal by oil, or the buggy by the automobile.

Overlooked, of course, is the fact that methods, equipment and controls used by the industry have undergone extensive change, although the basic principles of milling have remained the same. In fact, complete mechanization and automation were developed and applied first in the milling industry.

J. A. Shellenberger

For the past century every modern mill constructed has been fully automatic and every new development which could conceivably be applicable to the milling process is in use, or has been tried.

Some of the most recent developments and trends in the flour milling industry will be considered here relative to certain other major changes taking place throughout the world.

Industrialization Objective

Industrialization is the objective sought in all less-developed countries as the means for improved economic conditions. This, combined with the growing political philosophy of independence and nationalism, will result in continued building of new flour mills in countries which heretofore have imported flour. We have seen these developments in South and Central America, the Caribbean area, the Philippines, Africa and Asia. Flour milling probably will no longer be associated mainly with the regions of wheat production. Mills will be built where the population resides, not where the grain is grown. With due regard for the so-called "population explosion," which is world wide but intensified in the countries where flour milling is at present least important, it appears this situation is likely to change.

In addition to consideration of a shift in the location of mills, there are several basic considerations which will have a marked impact on the economy and technology of milling in the future. The increased cost and availability of capital for mill construction and improvements; the ever rising cost of labor combined with the growing demands for uniformity of products will require the application of keen managerial skills and the rapid adoption of new technology. For example: The sanitation program required major adjustments in the thinking of mill managers and operators

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Face of Change (continued)

and required new technics. Improvement in the nutritional merits of wheat flour possibly could be the next phase which will require rapid change in the planning and cost aspects of mill operation.

The era of new mills referred to previously will lead to important savings in construction costs by the use of prefabricated buildings, equipment standardization, and the shortening of the milling process. New machine designs, pneumatic conveying and planning ingenuity should compress milling operations into a fraction of the space now used for equal capacity, and this will be done at a reduction in building costs. Older milling units utilizing the ultimate in the historical system of gradual reduction will be a thing of the past. Undoubtedly, impact grinding will be used more and more to reduce some stocks. Competition will force changes in milling operations to obtain improved yields of flour at a lower labor cost and less total investment.

Plant Breeding

It is not too much to assume that eventually plant breeding techniques will result in a radical change in the physical and chemical properties of the wheat kernel. Changes which could result in drastic alterations in milling would be the removal or reduction in the size of the kernel crease or in the ratio of bran to endosperm. Possibly also, the amount of protein and the assortment of amino acids and vitamins might be altered to add to the nutritional value of wheat.

Among new developments already in use or in advanced development are such items as better methods for wheat washing, more knowledge of wheat conditioning, and practical procedures for fine grinding and air classification. In fact, this latter consideration is one of the most interesting topics at the moment.

Although knowledge about the protein structure surrounding starch cells and the possibility of separating these constituents has been known for some time, practical commercial developments in the milling industry for fine grinding and air classification have been relatively slow to develop. Capital expenditures for process development and equipment must be justified on the basis of added revenue from the products produced. Except in marketing of certain special products, fine ginding and air classification may not be an economic operation.

Perhaps a more radical change in milling operations would be the application of wet milling to wheat, combined with use of the continuous baking process. Thus, the milling and baking operations would become one. The product of wet milling would not necessarily need to be dried, only centrifuged and introduced wet into the continuous baking operation flow. It is conceivable that wet milling could result in substantially higher yields of endosperm than is possible now by conventional milling methods.

Many differences of opinion exist regarding the importance of developments such as the Pratique roll feeder and the Hungarian Semensect system. Recent mill construction does not indicate any substantial reduction in total roll surface such as predicted by using the Pratique system. There is a decided trend throughout the world toward the North American grinding system rather than the Euro-

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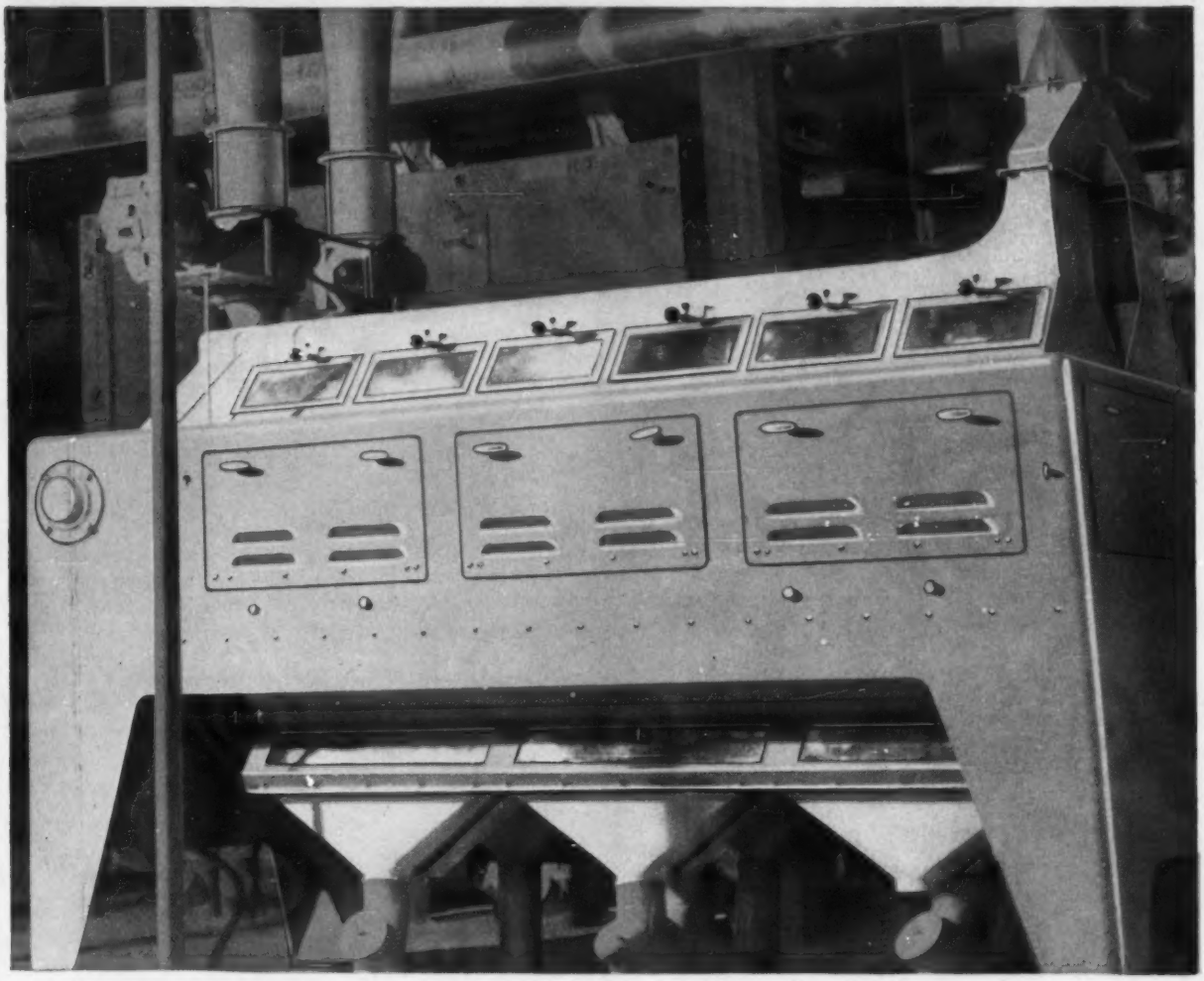

New, all-metal, twin-deck Model 4072 purifier

new efficiency and sanitation standards

Increased sanitation. Clean-line design is the reason. The new A-C Model 4072 purifier features all-metal construction with receding contours — provides maximum protection from infestation. Sealed-leg design makes floor cleaning around the purifier fast and easy. All purifier parts are easily accessible for cleaning and inspection.

Increased efficiency. Twin decks give twice as much screening area. Each deck is sectionalized — each section has its own air control. Air blankets the entire cloth area giving maximum separation efficiency.

Other features of the new Allis-Chalmers Model 4072 purifier practically eliminate maintenance. Unit has only one drive shaft and six bearings. Rubber bushings on sieve-supporting arms never need lubrication. Identical weight of twin decks eliminates the need for balancing mechanism. Feeder pan operates without separate drive. Material moves through the purifier without mechanical aid. Removable sieve sections permit cloth changes without interrupting machine operation.

• • •

Ask your A-C representative about the new purifier. Or write **Allis-Chalmers,** Industrial Equipment Division, Milwaukee 1, Wisconsin. A-1324

Milling's Changing Face (continued)

pean system with its slow speed and uncrowded grinding. The principle of the Pratique patent is to feed the roll to full capacity, but this has been a common practice in mills in the U.S., where high speed grinding is used. The Hungarian wheat slicing device is a new approach to milling techniques. It has attracted much attention without resulting in much actual use.

Look for Instrumentation

Instrumentation is sure to be one of the most important considerations in the years immediately ahead. Complete automation is entirely possible, including accurate automatic moisture and color recording with feedback roll settings and purifier adjustments. This latter system is used experimentally already in the U.S.S.R.

There will be many improvements in the handling economies of wheat, and bulk handling of manufactured products as now known is only the beginning. The major labor cost in milling operations is the result of materials handling; consequently, efforts to supply automation to this high cost operation will be great. The future also will see the complete integration of laboratory techniques in mill operations. Sanitation will become more important than it is already because the future will see complete sterilization of the milling process as well as the products.

The future also will see more intense research effort devoted to the development of new natural maturing and improving agents for flour. Laws which now preclude the use of chemicals in flour in many countries of the world, will become more common in regions where chemicals are now used. However, it seems likely that flour will be nutritionally modified with the use of lysine, this being only the beginning of many similar developments to come.

In other words, there seems to be a trend throughout the world toward prohibiting bleaching or maturing agents in flour, but there is a growing tendency to consider favorably the supplementation of flour with additives which enhance the nutritive value.

Also, millfeed will be modified to restore its former importance as an essential constituent of feed. Millfeed has suffered because of competition from all types of dehydrated grasses. It is essential that a way be found to make the by-products of the milling industry more competitive as a source of feed.

There will be more and more exacting flour specifications for millers to meet. This will result from increased use of automatic baking operations which will require flour of great uniformity. This demand of bakers for uniformity will be met by blending flours of different types. Bulk storage and blending will be an even more vital operation in the milling industry than it now is.

In summary, these are some of the world-wide developments in milling:

- Current political philosophy combined with nationalism will lead to the continued construction of new flour mills in all parts of the world. Population increase will, to some extent, provide the market for this increase in flour production. New mill construction in countries which normally imported flour will alter the established export trade pattern but need not necessarily result in eliminating imports because of the need for special types of flours and flours whose properties are accurately controlled.

- There will be economies in mill construction due to prefabrication, shorter milling processes and greater standardization of equipment. High capital and labor costs will cause management to seek new ways of increasing efficiency. Materials handling is one of the items of greatest unit cost; therefore, it is in this area that the greatest effort will be made to reduce operating costs. There will be improvements in cleaning, conditioning and purification which, combined with heavier loading of mills and shorter systems, will bring more economical operation. Bulk handling has made a start in cost reduction but it is only the beginning.

- Possibly in the future, bakery operations may be combined with milling, thus reducing the cost of product handling. Perhaps also, a wet milling process for wheat will lead to increased yield of endosperm material and use of the product in the baking industry without drying it. Thus, in one continuous operation, wheat would be converted into bread.

- Centralized automatic controls and adjustments of milling equipment will come about rapidly. There will be much new research and new effort devoted to increasing the nutritional merit of flour, and sanitation will become even more important than at

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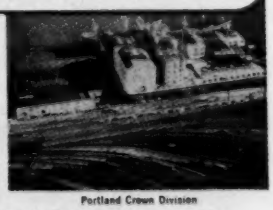

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Continual expansion of the processing industries demands equipment designed and developed for *today*. Our MIKRO-BUD is an example of this type of planning. Recent changes in this vertical hammer mill were dictated by field tests on a variety of materials including cocoa, rubber accelerators, sodium sulphate, sugar, phenolic resins, dyes, colors and tobacco. Capacities have been stepped up from 40 to 100 per cent, depending on the material in process. Efficient air flow has added to the range of heat-sensitive materials handled without coolants. A selector control wheel allows adjustment over a wide range of particle sizes without shutting down the mill. Write for Bulletin 51-C-1.

The MIKRO-BUD is one of four different designs and 12 sizes of Mikro pulverizing equipment offering grinds from granular to the lower micron ranges, and capacities up to 20,000 lbs/hr on certain materials.

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present. Complete sterilization of the mill and mill products will be the goal.

● Fine grinding, air classification and pneumatic conveying are among the newer—but now well established—milling innovations. Pneumatic conveying provides greater flexibility in mill design and construction and will lead to important economies. Fine grinding and air classification can bring about better utilization of wheat, better control of flour grade and the production of special food and feed products as well as products which could assume important industrial uses.

The milling industry has changed, is changing, and will change greatly in the future. This is as it should be «

"Al Sproul, who does carpenterin' and general repairin' an' is pretty slack-jawed when half full of fresh-made licker," said Old Dad Fetchit of the Fish River Roller Mills, "was tellin' the other day up to Stone's Store that he'd be dawg-gawned ef he could see how me and the other millers along the crick could be so achin' anxious to work twenty-four hours when eight hours was long enough for anybody to work an' he'd favor passin' a law cuttin' us down to a reg'lar day an' then see ef we'd still keep on claimin' to be downtrodden an' picked on. I didn't jaw back non at Al, an' I'm right glad I didn't, for the more a feller thinks it over the more he gits the idea that forcin' mills to run short time mightn't be such a dang pore scheme."

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Daffin, Superior Choose Firm Name

Daffin Corp. is the new name which now officially denotes the firm resulting from the merger of Daffin Manufacturing Co., Lancaster, Pa., and Superior Separator Co. of Hopkins, Minn. Approval of the new corporate title, and official confirmation, have been made by directors of the respective firms.

Operating divisions of the new organization are the Fluidizer Co. for air conveying systems; the Superior Co. for grain, seed and feed processing systems; the Farmhand Co. for animal feeding systems and harvesting and materials handling equipment, and Daffin Manufacturing Corp. for mobile and stationary feed mills.

Headquarters of the new company will be in Hopkins. C. F. Pierson will be president and chief executive officer; F. P. Watts, vice president, finance; A. A. Kole, vice president; A. H. Seed, secretary and treasurer; C. H. Dodd, assistant secretary; R. W. Long, assistant secretary, and E. C. Beezer, assistant treasurer. «

EXPORTS OF RYE

Canada failed to export any rye in May and the aggregate movement for the first 10 months of the 1959-60 crop year remained at 2,569,000 bu. compared with 1,291,000 for the corresponding months a year ago. In the current crop year, the U.S. has taken 2,224,000 bu. rye from Canada. In the August-May period of 1958-59, only 191,000 bu. crossed the international boundary. «

GRIST of GRINS

The psychiatrist was not sure that his patient was normal. Suspiciously he asked: "What do you do in your spare time?"

"Oh," the man blushed, "I just sit around mostly."

"Hmmm—never go out with girls?"

"No."

"Don't you even want to?"

The man was uneasy. "—Well, yes, sort of."

"Well, why don't you?"

"My wife won't let me."

●

A French hostess who had never been to the U.S. was entertaining a Fulbright scholar and displayed some knowledge of American history. Because of her interest, the American was explaining how the constitution came to be written and its pertinent passages.

The French hostess interrupted to exclaim:

"I am a great admirer of Thomas Jefferson and your country's motto." She paused, sighed, and said: "It is magnificent . . . 'Life, Liberty, and the Happiness of Pursuit'."

●

"How do you do?" said one patient in the doctor's anteroom, sticking out his hand.

"So, so," said the other, "I'm suffering from arthritis."

"Glad to meet you!" boomed the first patient. "I'm Jones from Chicago."

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Merchant Millers KENT, OHIO, U. S. A.

Millers of Soft Winter Wheat.

We specialize in laboratory controlled production of superior Cake, Pastry and Cracker Flours from carefully selected wheats.

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Ogilvie Flour Mills Co.
Pillsbury Company
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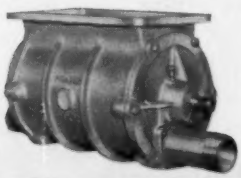
St. Louis Flour Mills



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WRITE FOR BULLETIN P-58

PRATER PULVERIZER COMPANY

1519 South 55th Court — Chicago 50, Illinois

HOW TO KEEP CLEAN GRAIN CLEAN FOR LESS THAN 1/5 CENT PER BU.

For long-term, low-cost protection against insects, introduce Cyanamid's Premium Grade Malathion before or after fumigation, when bins are filled or when grain is turned. (Use it too, for surface protection and for bin cleanup.)

All new grain or reinfested grain must be fumigated to make it really clean... free of adult insects and free of larvae and eggs inside and outside the berries. Once clean, Cyanamid's Premium Grade Malathion will keep it protected from all the listed insects *for less than 1/5 cent per bushel.* Several factors determine the duration of this protection, including variety of insect, tightness of storage, moisture content of the grain, etc. Generally, however, Malathion Premium Grade introduced into the grain stream as it is being stored, or turned, will give control for *three months to a year or more.*

Advantages of Malathion

Malathion Premium Grade kills the insects – Malathion is *powerful.* Excellence of control has been proven by commercial elevators, as well as by State and Federal researchers. As you can see in the chart, the list of insects controlled is long...and includes the toughest species.

Malathion is low in toxicity to man and animals – Malathion is actually recommended for direct application on animals and poultry. Residue tolerance in grain is 8 parts per million. Levels normally found after treatment are well below this level.

When applied as directed, malathion has no effect on grain germination or baking qualities ...nor on milling qualities. Malathion does not produce off-flavors in products manufactured from treated grain.

How to use Malathion

For protection of grain mass – Malathion can be introduced into the grain stream as a dust or spray. It can be applied during initial storage (and then fumigated) or when grain is turned. Use one pint of 57% emulsifiable liquid per 2 to 5 gallons of water for each 1000 bushels. Or, apply 5% premium grade malathion dust at 60 lbs. per 1000 bushels of grain.

For surface protection – Malathion can be applied to the surface of stored grain for top protection against surface-working Indian meal moth. It should be worked in to a depth of six inches. Use one pint of 57% emulsifiable liquid per 2 to 5 gallons of water for each 1000 bushels of grain in this top layer.

For bin cleanup – Spray Malathion Premium Grade thoroughly over swept-up surfaces. Use one quart of 57% emulsifiable liquid per 25 gallons of water.

Malathion 57% Premium Grade Emulsifiable Liquid is now available under Cyanamid's own label. Marketing is being handled through regular distributors of our grain fumigation products.

For additional information, write to American Cyanamid Company, Agricultural Division, 3217 Gilham Plaza, Kansas City 3, Missouri. When writing, ask for free leaflet "Protect Stored Grain with Malathion – PE 5045".

The first step in an effective grain storage program is a thorough clean-up before the grain is turned-in. Cyanamid's Premium Grade Malathion is ideal for this purpose. It kills both larvae and adults of all major grain pests.

MALATHION PROTECTS GRAIN AGAINST THE FOLLOWING INSECTS

Confused flour beetle — Rice weevil — Granary weevil
Saw-toothed grain beetle — Flat grain beetle — Red flour beetle
Rusty grain beetle — Lesser grain borer — Indian meal moth

Sprayed or dusted on grain as it goes into storage, or as it is turned, Premium Grade Malathion can extend the protection of one fumigation from 3 months to a year or more depending on the storage. Dusts are available for the control of surface-working insects.

CYANAMID

MALATHION
GRAIN PROTECTANTS

CYANAMID SERVES THE MAN WHO MAKES A BUSINESS OF AGRICULTURE

Shippers Relate Why Rate Changes Opposed

The Eastern Railroads Executive Traffic Committee has tabled its sweeping rate change proposal until at least May 1, 1961, as reported in THE MILLER of July 11, page 11. The accompanying statement is the full text of the brief presented on behalf of the Pillsbury Co., General Mills, Inc., and International Milling Co. by William T. McArthur, transportation vice president, Pillsbury, explaining why the large shippers oppose the rail rate proposal. Associated with Mr. McArthur in the presentation were F. F. Flinchbaugh of International and A. M. Thomas of General Mills.

This statement is made in behalf of International Milling Co., General Mills, Inc., and the Pillsbury Co., the three largest milling companies in the country. The combined freight bill of the three approximates $300 million. All three are users of wheat originating in Illinois and central territory and will be vitally affected by the revised grain and grain products rate structure, however it is finally worked out.

We think most of the carriers involved are well aware of the community of interest that lies between us: We as millers are dependent upon you for service but you are dependent upon us for dollars, and we have to assume you do not want to abandon us completely in order to develop the maximum protection for yourselves.

The Seaway, rivers and trucks have created a situation that requires change, and we realize changes will come, that we no longer can expect to have things just as they have been in the past. But we believe, most sincerely, that the way to create this change is in a manner to cause the least harm possible to both carriers and shippers.

Short Study Period

In order to explain the inadequacy of this statement it is necessary to point out that whereas your committee has been working on the present proposals for over a year we, as shippers, are given less than 30 days to study, assimilate and apply the proposals to our business. While this may be intended as complimentary to us and our abilities, we have failed. We cannot at this time give you the answers you need.

At a recent meeting of representative flour shippers in Chicago, two things became readily apparent; we shippers do not understand all of the proposals involved; in several instances we do not know what is proposed, and the many and varied interests involved cannot agree on just what should be done.

The effect of the present proposals breaks into several categories, and we believe our feelings can best be made known by briefly expressing an opinion in connection with each.

On the shippers' side we have four main businesses involved—bakery flour, grocery flour and cereals, animal feed and soybeans and soy meal.

This statement will be confined to human food, not that the three of us are uninterested in animal feed and soybeans, but there are those exclusively in those businsses better qualified to speak, and our interests are mutual.

On the carriers' side, it appears the following are considered to be extremely important—origin groups, minimum weights, rate levels, three way rule and routing.

Export Situation

In order for you to understand our approach to the problems created by the new proposals, it is vital that you understand what has already happened to us. When you reduced the Illinois CTR rates to Baltimore for export over a year ago to protect yourselves against the Seaway, you caused the basis for buying wheat in the country to change. The effect was to increase our wheat costs, and the three companies for whom I speak lost over a million dollars last year through this action.

Our only possible offset to these losses rested in the domestic adjustment being worked out. Consequently, the current proposals are a great disappointment inasmuch as they not only provide little relief but actually add more penalties and losses to those already suffered.

An understanding of the export situation is necessary in order to appreciate our position. In 1928 and 1929, when our wheat prices were basically controlled by a world price, the U.S. wheat crop was some 800 million bushels, of which 200 million were exported and 600 million consumed domestically. The Smooth Hawley Tariff bill of 1930 completely killed the export business, and it is only in recent years that this business has returned.

In the crop year just closed the crop was a billion bushels and 475 million were exported. The meaning of this is that this country is back on an export basis much of which is due to Public Law 480.

This places an emphasis on export rates such as we have not seen for 30 years.

We point no fingers at anyone for our misfortune due to your trying to protect yourselves against the Seaway,

for better sanitation at lower cost:

SYNTHETIC PLASTIC COATINGS

applied professionally by Western Waterproofing Company

Modern science has developed effective new materials for better, lower cost sanitation in milling production and storage areas. The new synthetic resins and plastics form slick, tough coatings that fill dirt-catching, insect-harboring crevices in floors, walls, ceilings. The smooth, unbroken plastic surface is easier to clean, and stays clean longer. These versatile products—of which there are many types for a variety of uses—can be applied over any type of construction: wood, metal, concrete, masonry. They are available in a number of colors, textures and price ranges.

Let us show you how these modern coatings can help you with the big problem of sanitation in your mill. Send coupon today. 5018

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Please let me know how coatings can improve sanitation in my plant.

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but this explanation should add to understanding of our problems.

Now to become more specific:

Because of the export situation and the fact that the central states wheat involved is now on an export basis, it is most important that origin groups be the same both domestic and export to the greatest extent possible. This is not only desirable but necessary. We realize this is hardly possible from Illinois to destinations in Indiana and Ohio, but it can be possible to trunk line without doing undue violence to the carriers.

The proposed change in groups is not satisfactory and will cause us hardship without offsetting compensation and will not, in our opinion, accomplish much if anything for the carriers.

Minimum Weights

The creation of rates on 40, 60 and 80,000 lb. minimums is an innovation in the domestic rate structure which requires comment and analysis in regard to what is now happening.

Bulk bakery flour moving in Airslide cars today is loading between 95,000 lb. and 105,000 lb. The average loading of sacked bakery flour is in excess of 60,000 lb. The 40, 45 and 50,000 lb. cars are a small minority of the total and are the ones that would be penalized severely by the present proposals.

The distribution pattern of grocery products is undergoing a vast change. Most manufacturers are moving their production into distribution warehouses close to the area served, there to store and reship mixed cars direct to customers.

Grocery products are packed in cases or bales and can load only up to 60,000 lb. without undue crushing and breakage. Our average customer loading is about 52,000 lb.

The proposed minimums, if thought of in the incentive category, will not operate as an incentive to heavier loading. We do not believe the flour business lends itself to such type of pressure.

Bakery flour is loading heavy today. The movement of grocery flour is heavy, close to 60,000 lb. into the distributing warehouses, which comprises two-thirds or more of the total haul. The movement outbound is lighter and would revert to the 40,000 lb. minimum rates due to the storage in transit involved.

It is very much to the advantage of the manufacturer to sell, load and ship the largest cars possible. Unfortunately, we do not and cannot control this; the buyer controls, and he in turn is influenced by many things such as size, credit, warehouse space, et cetera.

General Mills, Pillsbury and others appeared before you early in 1959 in connection with cake mix rates, and an adjustment resulted which we think and hope will hold this growing business to the rails. Flour was already held to the rails by transit, but we now see a high degree of jeopardy being raised by the 40,000 lb. rates.

Truck costs today, in many cases, are lower than the new cake mix rates. In cars including flour, which most of them do, the flour rates make it economically sound to keep cake mix on the rails. The substantial increases in the 40,000 lb. flour level will change this if you insist upon class rates on the low minimum level. We sincerely believe a substantial part of our grocery business will go to the highways.

We do not believe it proper or necessary for different minimums on flour, as we do not believe it possible to change all of the different buyers into something they are not.

Credit Factor

Credit is a most important factor that governs how large a car a buyer can take.

(Turn to **RAIL RATE PROPOSAL**, page 67)

"Golden Loaf" FLOUR

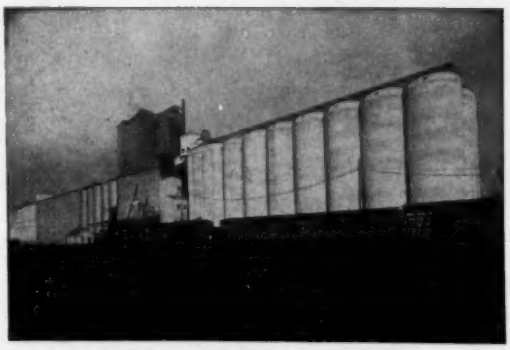
Milled from choice spring wheat under modern laboratory supervision for particular bakers—aged—aerated—bulk or sack loading.

Quality Flour for 59 Years

TENNANT & HOYT COMPANY

LAKE CITY, MINNESOTA

STRATTON-THEIS GRAIN CO.



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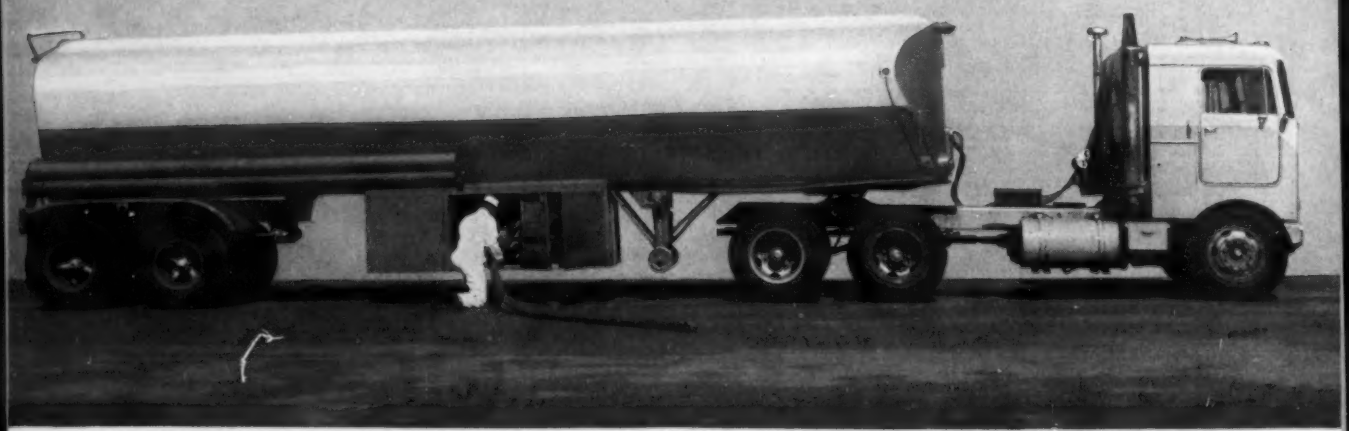
Fast 3-way Delivery Helps Make Commander Larabee "Better to Buy from"

Pick the "package" that suits your needs... Air Slide® Car, bulk truck, or bag. Commander Larabee provides all three.



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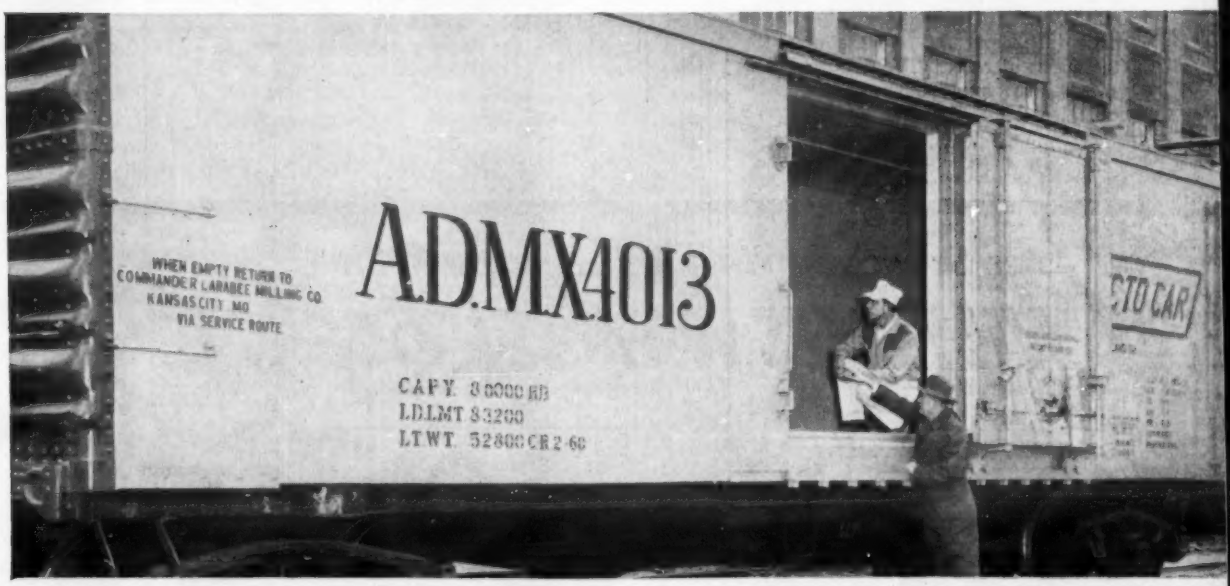
1 BULK TRUCK. More and more Commander Larabee customers are capitalizing on convenient bulk delivery regardless of location. Fast, efficient transfer from bulk car to bulk trailer insures safe "sealed" delivery from mill to bakery. It is one more way you can receive dependable Commander Larabee flours in bulk.

2 **AIR SLIDE CARS.** Special ventilating techniques developed by Commander Larabee help keep condensation to a minimum. Proven bulk handling methods assure maximum car unloading, bin discharge and conveying efficiency. They're yours from Commander Larabee.

3 **ADMX.** Here's the best for shipping sack flour. Insulated cars maintain even temperature in transit. Sealed plastic lining and flush doors give a smooth interior which prevents bag damage. Next time you need dependable, top performing flour in bags, check on Commander Larabee ADMX.



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COMMANDER LARABEE DIVISION

MINNEAPOLIS • KANSAS CITY

A Milling Technology Feature

Farinograph Curve Characteristics Of Milled Flours

By R. K. Bequette, R. B. Potts and C. A. Watson

Comparison of Brabender Rapid Test and Brabender Quadruplex Results with Those Obtained from the Buhler Experimental Mill

A correlation coefficient as used in the accompanying article, designated by r, expresses the degree of relationship existing between two variables. A value of 0 means that there is no relationship between the two variables while a value of 1 indicates a perfect relationship. The standard error of a mean difference (s_d) indicates the amount of error included in an average value due to errors involved in the various determinations. If two averages are significantly different, their difference will exceed twice the value of the standard error of a mean difference.

Segregation of commercial lots of wheat on the basis of dough characteristics has been limited due to lack of a rapid, reliable and inexpensive method of preparing flours for testing with a recording dough mixer.

Various methods of preparing crude flours and sifted wheat meals for testing in the mixograph and farinograph recording dough mixers have been proposed (4, 5, 6, 7, 8).* None of these procedures have been widely accepted, although they have been used in selecting early generation hybrid lines.

In 1935 the Brabender Corp., Duisburg, Germany, placed a small, automatic laboratory mill on the market (the Brabender Rapid Test mill). This unit, which employed two pairs of conical artificial mill stones and two plan-sifters, was designed primarily for rapid production of flour for farinograph tests. Geddes and Aitkin (3) reported that to obtain satisfactory milling results with this mill, it was necessary to condition the wheats to a much higher moisture content than was required when the samples were milled with an Allis-Chalmers experimental mill.

Flours from the Brabender Rapid Test mill were higher in ash and absorption than were flours milled with the Allis-Chalmers experimental mill, but the corresponding Allis-Chalmers and Brabender Rapid Test flours were ranked in about the same relative order of strength by the farinograph. These workers did not correlate farinograph curve characteristics of the corresponding flours from the Brabender and Allis-Chalmers mills.

Bottomley (2) compared flours from a commercial mill with those from the Brabender rapid test mill and found that protein content of the corresponding commercial and Brabender milled flours was approximately the same, although ash contents varied widely. Bottomley stated that farinograph curves of the corresponding flours were similar in type, but the experimental flours gave a curve of less strength and stability than those of the commercially milled flours.

Recently, C. W. Brabender Instruments, Inc., South Hackensack, N.J., introduced a small laboratory roller mill (the Brabender Quadruplex mill) designed to produce flour for farinograph tests. There is no information available concerning the accuracy of farinograph curves made from flour obtained with the new Quadruplex mill. This study was undertaken to determine the relationship between

*Numerical references are to the sources of literature cited, which will be found at the end of this article.

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farinograph curve characteristics of flours milled on the Buhler experimental mill and those of corresponding flours obtained with the Brabender Rapid Test and Brabender Quadruplex mills.

Materials and Methods

Fifty-eight samples of hard red spring wheat representing 10 varieties grown at six locations in Montana in 1958 were used to determine the relationship between milling results and farinograph characteristics of flours prepared with the Buhler and Rapid Test mills.

The spring wheat varieties included Thatcher, Ceres, Centana, Rescue, Pilot, Selkirk, Lee, Chinook, C.I. 13304 and C.I. 13242. A sample of each variety was obtained from experiment station plots at Bozeman, Havre, Sidney, Moccasin, Creston and Huntley, Mont. A 2,000 gram portion of each sample was milled on the Buhler experimental mill. A 500 gram portion of each sample was milled on a Brabender Rapid Test mill by the Pillsbury Co., Enid, Okla. The Rapid Test milled flours were returned to the Bozeman laboratory for moisture, ash and farinograph tests.

Two of the samples contained insufficient wheat for testing on the Rapid test mill.

Fifty-five samples of hard red spring wheat representing 11 varieties grown at five locations in Montana in 1959 were used to determine the relationship between milling results and farinograph curve characteristics of flours from the Buhler and Quadruplex mills. These varieties included those just listed plus Canthatch.

Samples were obtained from all of the experiment stations listed except Bozeman. A 2,000 gram portion of each sample was milled on the Buhler experimental mill. A 250 gram portion of each sample was milled on a Brabender Quadruplex mill. Moisture, ash, and protein contents of the Buhler and Quadruplex flours were determined and a farinograph curve obtained from each flour.

Wheat samples from small experimental plots are stored in paper bags for long periods of time and generally have a much lower moisture content than large commercial lots of wheat. Plot samples received by this laboratory average approximately 8.5% moisture. Therefore, the samples are tempered 48 to 72 hrs. prior to milling to permit uniform water penetration. The penetration rate may be increased by adding a wetting agent to the temper water.

Dockage was removed from all samples prior to analysis. Samples to be milled on the Buhler experimental mill (model MLU-202) were scoured and tempered to 16% moisture with distilled water 72 hrs. prior to milling. An additional .5 to 1.5% water was added 30 min. before milling.

Samples milled with the Rapid Test and Quadruplex mills were not scoured. Samples milled with the Rapid Test mill were tempered to 15% moisture for 24 hrs. An additional 1% water was then added and

The authors are indebted to John W. Meyer, milling engineer, and George W. Schiller, chemist, the Pillsbury Co., Enid, Okla., for milling samples on the Brabender Rapid Test mill and to C. W. Brabender, Brabender Instruments, Inc., for providing the Brabender Quadruplex mill used in this study. Mr. Bequette and Mr. Watson are assistant cereal chemists and Mr. Potts is wheat quality evaluation supervisor, Agronomy and Soils Department, Montana State College, Bozeman.

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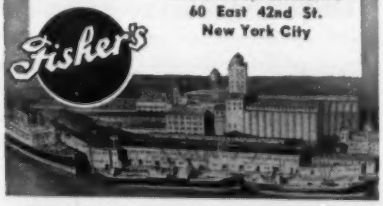

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the samples allowed to stand for another 24 hrs. before milling.

Several chemists using the Brabender Rapid Test mill reported personally that the same accuracy may be obtained by tempering to 16% with water containing a wetting agent 4 hrs. prior to milling.

It was necessary to establish a procedure for conditioning wheats to be milled in the Quadruplex mill since this information was not available. The effects of tempering to different moisture contents on flour yield, flour ash, flour moisture, farinograph absorption and farinograph curve characteristics of Thatcher and Ceres spring wheats milled with the Quadruplex mill are shown in Table 1. The farinograph curves are reproduced in Fig. 1.

TABLE 1

Effect of Temper on Milling Results and Farinograph Characteristics of Thatcher and Ceres Spring Wheats Milled With the Brabender Quadruplex Mill

Mill	Temper* %	Milling: Flour yield %	Flour ash† %	Flour moisture %	Farinograph: Absorption† %	Peak (min.)	Stability (min.)	Valorimeter
Thatcher**								
Quadruplex	13.0	60.0	0.83	12.0	65.5	5.5	6.5	60
	14.0	58.0	0.70	12.6	65.7	6.5	8.0	64
	15.0	58.5	0.67	13.3	66.4	7.5	8.5	68
	16.0	54.0	0.65	14.0	66.0	8.0	11.0	70
Buhler	16.0	67.5	0.49		61.5	8.0	10.0	71
Ceres††								
Quadruplex	13.0	59.5	0.70	11.0	66.5	6.5	7.0	63
	14.0	54.0	0.64	11.4	65.5	8.0	9.0	67
	15.0	48.0	0.59	12.0	64.5	9.0	13.0	73
	16.0	50.0	0.56	12.4	64.5	9.0	15.0	74
Buhler	16.0	67.7	0.45		63.0	9.5	13.0	74

*Tempered overnight with distilled water containing 1 gram Tide/4 liters water.
†14% moisture basis.
**Moccasin, 1959 crop; test weight, 51.7 lb.
††Moccasin, 1959 crop; test weight, 55.5 lb.

The samples were tempered 18 hrs. with distilled water containing a wetting agent. As the moisture content increased, flour yield and flour ash decreased while farinograph peak, stability and valorimeter increased. The 15% and 16% tempers resulted in curves having peak, stability, and valorimeter values very similar to those of flour milled from the same wheat sample with the Buhler mill.

Additional experiments (data not reported) showed that Quadruplex flours having curves similar to those from the corresponding Buhler milled flours could be obtained by tempering to 16% for 4-5 hrs. with distilled water containing a wetting agent.

Sifters Supplied

Two sifters were supplied with the Quadruplex mill. One sifter was clothed with a brass screen having openings of 225 micron diameter, the other with a bolting cloth having 257 micron openings. The bolting cloth produced slightly higher flour yields and flour ash contents than the brass screen. However, flours from the two sifters produced similar farinograph curves.

For the study reported in this paper, samples milled with the Quad-

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	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Enriched BREAD or other *baked* products	1.1	1.8	0.7	1.6	10.0	15.0	8.0	12.5
Enriched FLOUR[1]	2.0	2.5	1.2	1.5	16.0	20.0	13.0	16.5
Enriched FARINA	2.0	2.5	1.2	1.5	16.0	20.0	13.0	*
Enriched MACARONI & NOODLE Products[2]	4.0	5.0	1.7	2.2	27.0	34.0	13.0	16.5
Enriched CORN MEALS	2.0	3.0	1.2	1.8	16.0	24.0	13.0	26.0
Enriched CORN GRITS[3]	2.0	3.0	1.2	1.8	16.0	24.0	13.0	26.0
Enriched Milled WHITE RICE[4]	2.0	4.0	1.2**	2.4**	16.0	32.0	13.0	26.0

* No maximum level established.

** The requirement for vitamin B_2 is optional pending further study and public hearings because of certain technical difficulties encountered in the application of this vitamin.

1 In enriched self-rising flour, calcium is also required between limits of 500-1500 mg. per pound.

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3 Levels must not fall below 85% of minimum figures after a specific test described in the Federal Standards of Identity.

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ruplex mill were tempered to 16% moisture with distilled water containing a wetting agent (1 gram of Tide per 4 liters of water) 18 hrs. prior to milling. The brass screen was employed.

Flour yields were calculated as the percent of total products obtained as a straight-grade flour on an "as-is" moisture basis.

Moisture, ash, protein and farinograph determinations were made according to the methods of AACC (1). The farinograph was equipped with a 50 gram mixing bowl and operated according to the Constant Flour Weight procedure. Statistical analysis were made according to the procedures outlined by Snedecor (9).

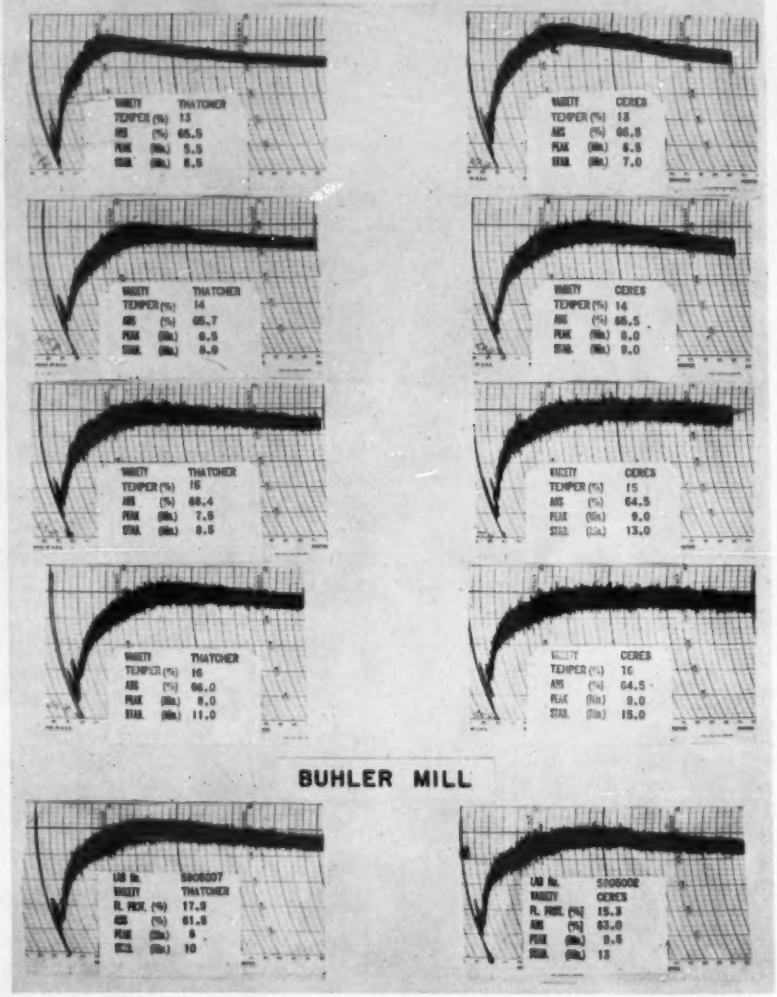
EXPERIMENTAL RESULTS

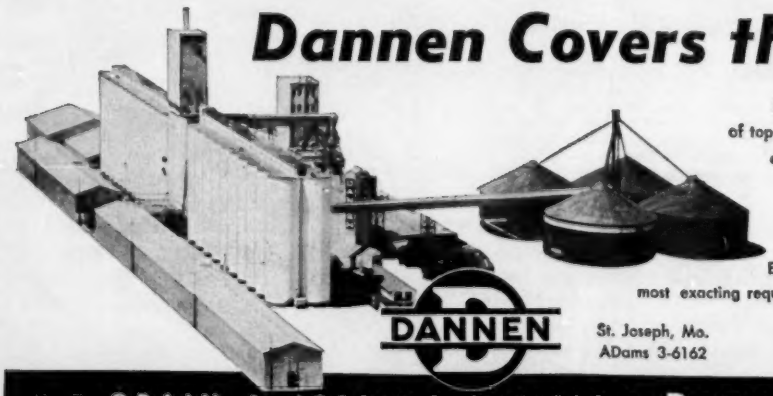
Brabender Rapid Test Mill

Spring wheat samples from the 1958 crop used to study the relationship between results obtained with the Rapid Test and Buhler mills represented a wide range of quality characteristics. Test weights varied from 56.5 lb. to 63.3 lb. per bushel, while protein content of the Buhler flours varied from 11.8% to 16.4%. Farinograph absorption of the Buhler flours varied from 60.0% to 72.5%; farinograph peaks varied from 3.5 min. to 10.0 min.; and farinograph stability values varied from 2.0 min. to 17.0 min.

A comparison between Buhler and Brabender Rapid Test mills for milling, analytical and farinograph characteristics is given in Table 2. Flour yields obtained with the Brabender Rapid Test mill averaged significantly lower (6.3%) than those obtained with the Buhler mill. Flours milled with the Rapid Test mill were not as refined as the Buhler flours. This is revealed by significantly higher (.25%)

FIG. I. EFFECT OF TEMPER ON FARINOGRAMS OF QUADRUPLEX FLOURS





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ash contents. There was no consistent relationship between flour yields obtained with the two mills, or between ash content of the two types of flours.

Farinograph absorption of the Rapid Test flours averaged significantly higher (1.6%) than the Buhler flours. Absorption of the Rapid Test flours was significantly related to the absorption of the corresponding Buhler flours ($r = 0.72^{**}$). A scatter diagram revealed that absorption values obtained on flours milled in the Rapid Test mill correctly placed the samples having very high or very low absorption, but did not give a reliable indication of the absorption of flours falling between these extremes.

Farinograph curves of the Brabender Rapid Test flours were somewhat weaker than farinograms of the corresponding Buhler flours as evidenced by significantly lower average peak, stability and valorimeter values. Flours milled with the Buhler had a greater variation in curve characteristics than the Rapid Test flours. Typical curves obtained on Rapid Test flours and the corresponding Buhler flours are shown in figure 2.

Peak, stability and valorimeter values of the Brabender milled flours were sufficiently accurate to permit classification of wheats as weak, medium or strong. The correlation coefficients shown in Table 2 indicate that stability values of Rapid Test milled flours gave a better estimate of the dough strength of the corresponding Buhler flours than peak M.T.I., or valorimeter values.

The relationship between M. T. I. values was poorer than for peak, stability or valorimeter values. This could be due to the error involved in taking the M. T. I. reading on curves obtained with the 50 gram mixing bowl.

Although the authors did not operate the Brabender Rapid Test mill, the information available indicates that the mill must be cleaned with considerable care to prevent sample mixing, and that one should not attempt to mill a sample containing less than 300 grams of wheat. The grinding rate for samples used in this study varied from 83 grams to 125 grams min.

Brabender Quadruplex Mill

The 1959 spring wheat samples used to compare the Buhler and Brabender Quadruplex mills had a wider range in test weight, were more variable in flour yields, ash, and protein, and were less variable in farinograph absorption and curve characteristics than the 1958 samples milled with the Barbender Rapid Test Mill. Test weight of the 1959 crop samples varied from 51.3 lb. to 62.5 lb. bu.

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Protein content of flours milled with the Buhler ranged from 10.9% to 17.5%. Farinograph absorption of the Buhler flours varied from 59.0% to 67.5%; farinograph peaks from 4.0 to 14.0 min, and stability values from 3.0 min. to 34.0 min.

A comparison between Buhler and Brabender Quadruplex mills for milling, analytical and farinograph characteristics is given in Table 3. Flour yields obtained with the Quadruplex averaged 8.1% lower than the samples milled with the Buhler mill. The Quadruplex flours were not as refined as those milled with the Buhler, as evidenced by a significantly higher average ash content (.11%).

There was no consistent relationship between flour yields obtained with the two mills, although flour ash content of the two types of flours was significantly correlated (r=0.68**). Wheats which produced extremely high or low ash content flours when milled with the Buhler could be identified using ash data obtained on flours milled with the Quadruplex mill.

Protein content of the Quadruplex flours averaged significantly higher (.5%) than the Buhler flours, but the protein content of the two types of flours was closely related (r=0.98**).

Farinograph absorption of flours milled with the Quadruplex averaged higher (.6%) than the corresponding Buhler flours. There was a significant relationship (r=0.78**) between the absorptions of the two types of flour and it was possible to identify samples having extremely high or low absorption using farinograph absorption data obtained from flours milled with the Quadruplex mill.

The peak, stability and valorimeter values of flours milled with the Quadruplex were sufficiently accurate to permit classification of wheat according to farinograph curve characteristics. Farinograph curves of the Quadruplex flours were very similar to curves of the corresponding Buhler flours. The peak, stability and valorimeter values obtained on the Quadruplex flours were a good estimate of these values of the corresponding Buhler flours and a better estimate of the dough strength of the corresponding Buhler flour than M. T. I. values.

The Quadruplex mill increased the efficiency of labor utilization within the laboratory. It was possible for one person to operate the mill at almost full capacity while operating the Buhler experimental mill, or while preparing samples for milling, etc. If the mill were positioned near a farinograph, one person could operate both at full capacity.

The feed gate on the Quadruplex was left fully open at all times, and the grinding rate varied from 15.6 grams to 25.0 grams min., and averaged 20.8 grams min. for the 55 samples used in the study reported in this paper. Less than 2 min. were required to clean the mill and empty the drawers in preparation for the next sample. Sample recovery was seldom less than 98.5%, with part of the loss accounted for by loss in moisture.

Summary and Conclusions

Fifty-eight samples of hard red spring wheat grown in Montana in 1958 were used to determine the relationship between milling results and farinograph characteristics of flours prepared with the Buhler and Brabender Rapid Test mills. In a similar study, 55 samples of hard red spring wheat grown in Montana in 1959 were used to determine these relationships between the Brabender Quadruplex and Buhler mills.

Flour yields obtained with the Brabender Rapid Test and Brabender Quadruplex mills averaged lower, and were not related to flour yields obtained with the Buhler experimental mill. The flours produced by the Bra-

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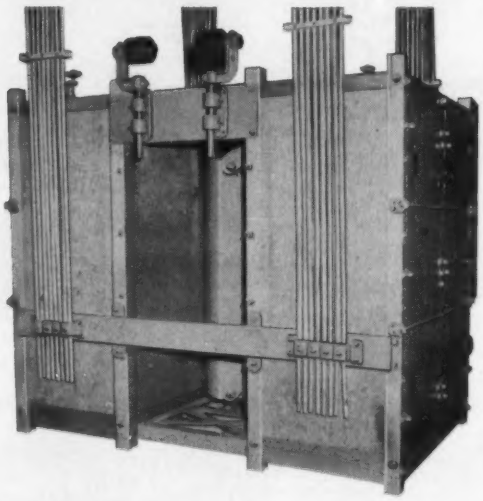

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bender mills were not as refined as the corresponding Buhler flours as evidenced by significantly higher ash contents. Ash contents of flours milled with the Rapid Test mill were not correlated with ash contents of the corresponding Buhler flours.

However, wheats which produced extremely high or low ash content flours when milled with the Buhler could be identified using ash data obtained on flours milled with the Quadruplex.

It was possible to identify samples having extremely high or extremely low farinograph absorption using absorption data obtained from flours milled with the Quadruplex or Rapid Test mill.

The Brabender Rapid Test mill must be cleaned with considerable care to prevent sample mixing, and it requires a larger sample of wheat than the Quadruplex. However, the grinding rate is approximately 5 times

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FIG. 2. TYPICAL FARINOGRAMS OF CORRESPONDING BUHLER AND RAPID TEST MILLED FLOURS

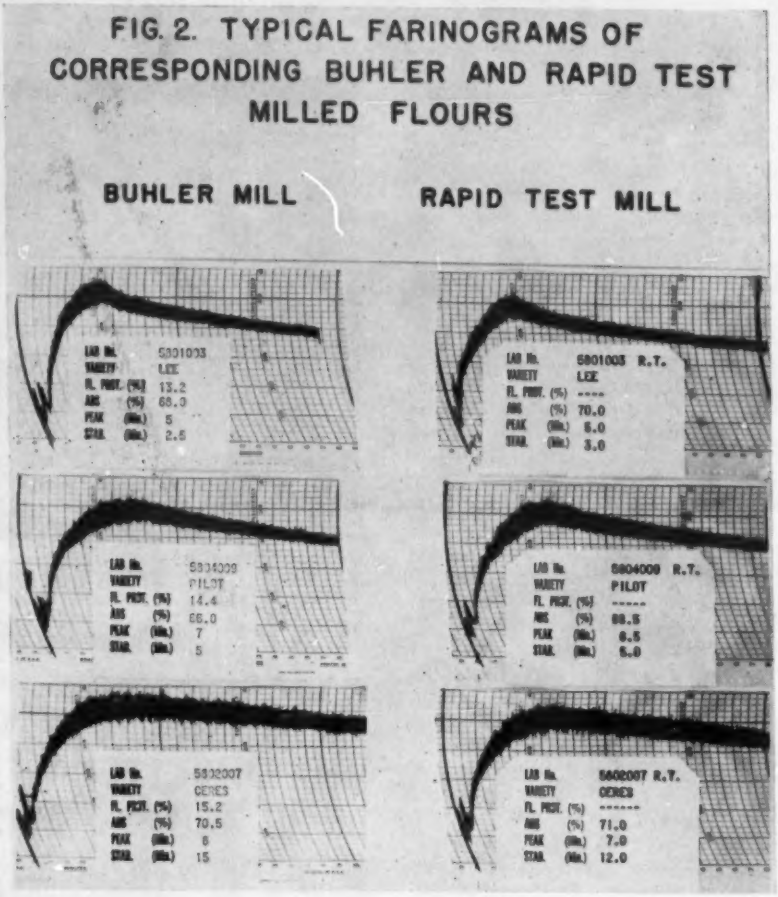
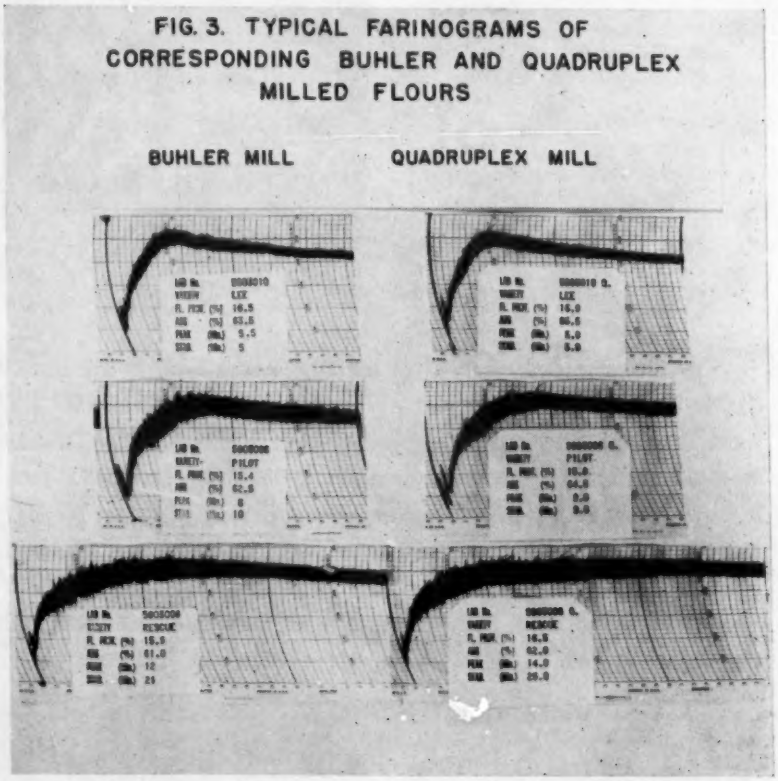


FIG. 3. TYPICAL FARINOGRAMS OF CORRESPONDING BUHLER AND QUADRUPLEX MILLED FLOURS



that of the Quadruplex. When the Rapid Test mill is operated with care, the farinograph curves produced are accurate enough to permit classification of wheats as weak, medium or strong.

The Brabender Quadruplex has practical merit for those who wish to classify wheats on the basis of farinograph curve charactertistics. Since all settings are fixed by the manufacturer, and since a minimum of cleaning is required between samples, an unskilled operator can produce flours having farinograph curve characteristics similar to those of flours milled with the Buhler mill while doing other jobs within the laboratory. «

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TABLE 2

Comparison Between Buhler and Brabender Rapid Test Mills for Milling, Analytical and Farinograph Characteristics*

	—Buhler mill— Minimum	Maximum	——Mean—— Buhler	Rapid test	Standard error of mean difference s— d	Correlation coefficient r
Flour yield (%)	67.5	75.4	72.7	66.4††	0.4	0.13
Flour ash† (%)	0.39	0.54	0.44	0.69††	0.01	0.23
Flour protein† (%)	11.8	16.4	14.4			
Farinograph:						
Absorption† (%)	60.0	72.5	66.3	67.9††	0.2	0.72**
Peak (minutes)	3.5	10.0	6.7	6.0††	0.1	0.84**
Stability (minutes)	2.0	17.0	7.1	6.2††	0.2	0.91**
M. T. I.	140.0	20.0	55.5	58.9	1.9	0.79**
Valorimeter	44.0	77.0	63.3	60.8††	0.5	0.97**

*55 samples of 1959 crop hard red spring wheat.
†14% moisture basis.
††Mean of rapid test mill significantly different (0.01% level) from mean of Buhler mill by t-test.
**Significant at 0.01% level.

TABLE 3

Comparison Between Buhler and Brabender Quadruplex Mills for Milling, Analytical and Farinograph Characteristics*

	—Buhler mill— Minimum	Maximum	——Mean—— Buhler	Quadruplex	Standard error of mean difference s— d	Correlation coefficient r
Flour yield (%)	65.0	75.4	69.6	61.5††	0.9	—0.04
Flour ash† (%)	0.37	0.62	0.47	0.58††	0.01	0.68**
Flour protein† (%)	10.9	17.5	15.0	15.5††	0.05	0.98**
Farinograph:						
Absorption† (%)	59.0	67.5	63.4	64.0††	0.2	0.78**
Peak (minutes)	4.0	14.0	7.0	6.9	0.1	0.95**
Stability (minutes)	3.0	34.0	9.2	9.7	0.4	0.90**
M. T. I.	0.0	80.0	41.0	37.1‡	1.7	0.82**
Valorimeter	50.0	91.0	65.1	65.4	0.5	0.96**

*55 samples of 1959 crop hard red spring wheat.
†14% moisture basis.
††Mean of quadruplex mill significantly different (0.01% level) from mean of Buhler mill by t-test.
‡Mean of quadruplex mill significantly different (0.05% level) from mean of Buhler mill by t-test.
**Significant at 0.01% level.

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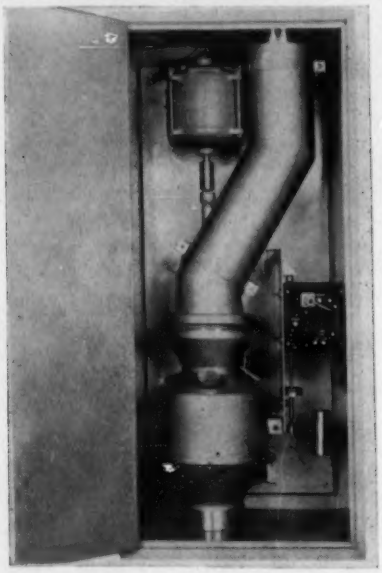
NEW IDEAS PRODUCTS SERVICES

This reader service department announces the development of new and improved products, new services and new literature offered by manufacturers and suppliers. Claims made in this department are those of the firm concerned. Use the accompanying coupon to obtain the desired information.

Dry-Flow Meter

Industrial Processes, Inc., now is marketing what it reports as a low-cost, precision device named the IPI dry-flow meter to supply the milling industry's need for an accurate method of weighing and metering a wide range of dry-flowing materials without interrupting flow. It is claimed that efficiency and reliability of the new meter have been proved with a full year of operational testing, with accuracy tests showing variance confined



to a maximum of 1%, plus or minus. Frank R. Ofner, president of the firm, states that the meter is not intended to substitute for beam scales, but rather to provide continuous, instantaneous or recallable stream-flow data and a low-cost approach to complete automation of dry-flow bulk processes. The meter operates on an impact principle, translating stream flow specific gravity into electrical current via a new type of electronic transducer. Optional instruments also are available.

Circle No. 4523
on Reply Form for Details

Booklet on Efficiency

A special report on efficiency in all phases of shipping and warehousing has been made available in a free booklet entitled "100 Ways to Save Money in Packing, Shipping, and Stockroom Operations." The brochure, prepared by Manpower, Inc., contains time and money-saving tips on general administration, packing, shipping, packaging, warehousing and public warehousing. An informational guide for plant and warehouse superintendents, purchasing agents, and stockroom supervisors, the booklet has valuable pointers on equipment, employee and administrative problems. "The 100 suggestions have been gathered with the help of many Manpower customers, experts in the packing and shipping industry and from experiences gained through serving most of the country's leading industries," Elmer L. Winter, Manpower president, points out in the introduction.

Circle No. 4524
on Reply Form for Details

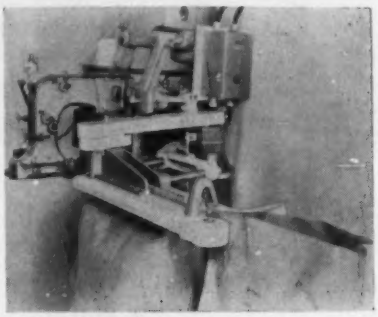
Bag Holder Bulletin

A bulletin (No. 0259) describing its "Universal" bag holder, designed for fast and simple operation, is offered by Richardson Scale Co. Available for either manual or air-operation, these units will hold burlap, cotton, paper or lined bags without danger of slipping. Gusset-grips make them especially suitable for multiwall paper bags with gussets. Eight pictures illustrate the grip action of the bag holders in open and closed positions. Also pictured is an air control unit for the Universal air-operated bag holder and a slip-on spout for manual filling of small bags. A reference table lists the 10 sizes of the bag holders and sizes of bags adaptable to each. The bulletin includes a three-view engineering drawing of a Universal air-operated unit.

Circle No. 4525
on Reply Form for Details

Faster Bag Sewing

The development of a sewing attachment to simplify and speed closure of multiwall paper shipping bags has been announced by Bemis Bro. Bag Co. The "Sew-Rite" attachment, which is mounted on the sewing pedestal, permits the bag to adjust itself properly before engaging the sewing machine. It is said to consume less operator time by actually carrying the bag to the sewing machine, and reduces thread and needle breakage due to improper handling of the bag during the sewing operation. An operator simply guides the filled bag into the co-acting V-belts of the "Sew-Rite." From that point, the bag is automatically fed into the sewing machine. The operator is free to grasp and lead the next bag into the attachment. The "Sew-Rite" enables the sewing machine to effect a neater and more secure closure than by direct feed methods and allows an inexperienced operator to obtain high efficiency on the packaging line, states Bemis.



Circle No. 4526
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Insect Control

The Huge' Co., Inc., has issued a brochure featuring its Excelcide insecticides, rodenticides, applicating equipment and preventive methods of control. The booklet demonstrates the method of residual insecticidal application, explains the insecticides and the applicating equipment and the method to provide for best insect control results. It also elaborates on space spraying-fogging equipment, procedures and materials for every type of control requirement. There is a page outlining the complete Excelcide rodent control program and an explanation of additional insect control weapons, including a complete program for flying insects both inside and outside a plant.

Circle No. 4527
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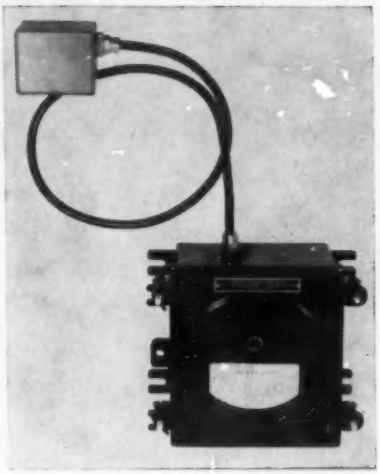
'Slipmonitor' to Cut Hazard of Fire

The "Slipmonitor," a device to operate an alarm when fire or explosion hazards are present in grain terminal elevators, is offered by Meltronics,



Inc. The device can be installed without modification to the leg belt or housing in order to maintain continuous "watch" over belt speed. When belt slip reaches a preset point, normally 20% of regular speed, "Slipmonitor" will operate lights or bells as a warning—or it can be used to shut down the drive motor. The manufacturer claims that ease of installation is one important feature because of the fact that no connection is made to the idler pulleys or the actual belt, making "Slipmonitor" dependent only on belt speed and not motor current.

Circle No. 4528
on Reply Form for Details

Heavy Duty Scales

A line of platform-type bench scales for heavy duty, general purpose weighing operations is now available from the Exact Weight Scale Co. Type 9600 scales are specially designed to provide continued accuracy under conditions of prolonged industrial usage. They are engineered with a minimum of moving parts for maintenance-free operation. Overload and bumper springs guard against excessive shock in loading and unloading. An adjustable hydraulic dashpot controls weighing speed over a wide range for fast accurate performance, it is claimed. Scales in any of four different capacities are available: 50 lb. with 1 oz. graduations; 100 lb. with 2 oz. graduations; 200 lb. with 4 oz. graduations, and 300 lb. with 8 oz. graduations.

Circle No. 4529
on Reply Form for Details

Flour Pilot Plant, Refining Unit

A pilot plant and refining unit for impact milling and separation of fine and coarse fractions from flour, which will operate either separately or together as an integrated unit, are being offered by Sturtevant Mill Co.'s grain processing division. The pilot/production unit is capable of handling up to 50 cwt. hourly of flour or other grains and can be used for research and actual production in small quantity mills or for special, small quantity flours for larger mills. Sturtevant will offer the pilot/production system as a "package." It can be specifically a grinding system, specifically a classification system, or an integrated grinding-classification system. Sturtevant will not only supply the equipment but also a qualified engineer, if desired, to start up the installation and instruct the miller in its operation.

Circle No. 4530
on Reply Form for Details

Moisture Removal

A technical information bulletin (M-2601A) about the use of "Hum-I-Dri-Cocoons" to eliminate excessive moisture in grain storage operations is available from Speco, Inc. Intended as a guide to elevator and other storage officials, it contains full details as to cocoon placement and moisture collection. Results of one year's use in a leading elevator are presented in tabular form. "Hum-I-Dri" is said to absorb moisture up to 10.28 times its own weight. It is also claimed to repel moths, destroy certain insects and act as a deterrent to mildew.

Circle No. 4531
on Reply Form for Details

All-Steel Building

The "Spartan," an all steel, economy building, has been developed by Martin Steel Corp. and is said to be adaptable for the miller and the terminal and elevator operator, among others. The structure, claims the manufacturer, is fireproof, rust-resistant, weather-tight, fully functional and rodent-proof. The building has flexibility of design to permit a wide range of uses, including general warehousing, plant production, office space or

other purposes. A wide array of sizes is available to suit individual requirements. It is available in widths of 12 ft. multiples enabling buildings up to 72 ft. in width. Lengths start at 32 ft., coming in multiples of 16 ft. to give any desired length. There are three basic heights of 10, 12 and 14 ft., plus any combination of sliding and walk-in doors, skylights, windows and ventilators.

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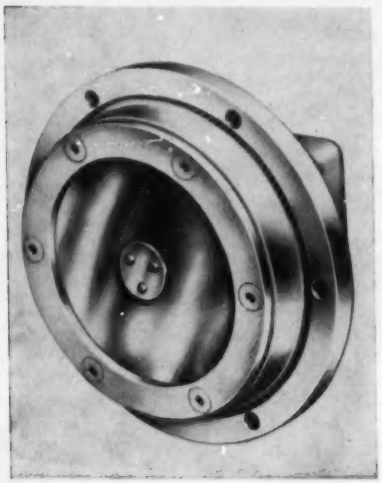
NEW Ideas, Products, Services

Hopper Level Switch

A compact, explosion-proof switch to control the level of material in bins, hoppers or chutes has been developed by Syntron Co. It is a 7-in. diameter model which the manufacturer says does not require a special adapter ring for mounting because it may be mounted directly through the surface



of the bin. Syntron claims that the switch is ideal for small hoppers because it is not bulky, therefore requiring less space. The unit has one control switch for operating a relay or feeding device and it also can be equipped with two switches for operating a number of relays or devices which may be included in the process.

Circle No. 4533
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Weatherproof Coating

Tropical Paint Co. has introduced "Tropilume," an aluminum-asphalt-asbestos coating said to be useful in coating such structures as grain elevators and storage bins. The coating is brushed directly on without priming. It is claimed to reflect the sun's rays and to form a lasting bond with concrete, brick or bituminous surfaces. As soon as applied, bright aluminum particles rise to the surface to form an attractive finish with reflective properties reducing inside temperatures to cut spoilage from mold or insect damage.

Circle No. 4534
on Reply Form for Details

AMFLOW Described

Descriptive literature on AMFLOW, the automatic process for continuous fermentation and mixing available from the bakery machinery division of American Machine & Foundry Co., has been compiled into a two-color brochure. The material deals with savings and product improvements possible with AMFLOW over conventional breadmaking methods.

Circle No. 4535
on Reply Form for Details

Bolting Cloth Table

H. R. Williams Mill Supply Co. is offering to millers without charge a comparative table of bolting cloth for quickly determining the percentage of open and mesh areas for the fabrics and materials in use. The table, made of sturdy tag board, has a card containing the necessary figures which slides up and down in the slot of an envelope, using the same principle of matching numbers as most standard proportion rulers.

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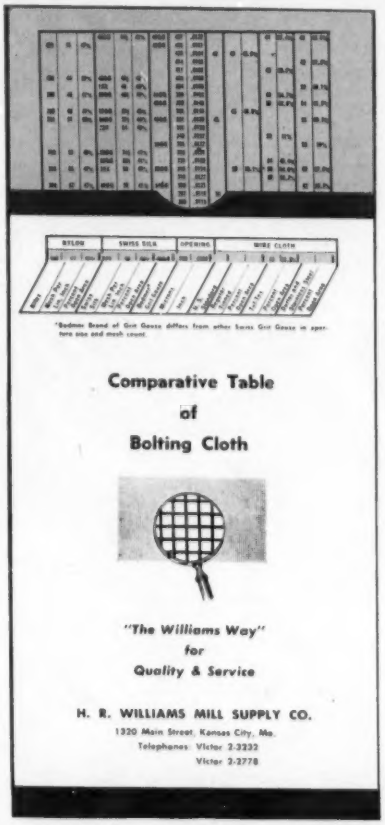

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While they are not intended as a substitute for scale-beam weighers, "IPI" Dry-Flow Meters accurately measure bulk flow volume in unit weights, of materials such as: any type of grain, break-stock, bran, shorts, middlings, flour (even *corn flour*), wheat germ, wheat starch, semolina, durum granulars, tailings, screenings, pellets, pellet fines, crumbles, or *any other dry-flowing bulk materials.*

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The accurate information provided by IPA Dry-Flow Meters allows precise manual control of bulk flow volume by weight and—*for the first time*—provides a low-cost device needed for a complete automated system involving dry-flow bulk processing.

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You will find IPI Dry-Flow Meters invaluable for evaluating and controlling flour mill performance in these locations: Wheat being fed to tempering process, to pre-break and/or first break, patent flour stream, first clear flour, second clear flour, all by-product feeds and the key process streams —breaks, middlings, sizings, tailings, low grades and purifiers.

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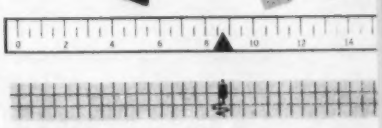

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A Milling Technology Feature

Public Enemy No. 1: Confused Flour Beetle Has Been Causing Trouble Since Pharaohs' Time

By RICHARD T. COTTON

The confused flour beetle is small in size, but his tiny brown body contains an insatiable appetite that has, in part, pushed the cost of producing high grade U.S. flour to an all-time high.

To hold him in check requires an annual cost in fumigants, sprays and man hours of labor that is difficult to check. The quantity of cereal products actually consumed and the value of the merchandise which he renders unfit for human consumption each year also are hard to check—but the beetle's activities certainly rate him as the industry's No. 1 public enemy.

Richard T. Cotton

The most important source of insect infestation in the flour mill is the grain used in the manufacturing process. With bumper wheat crops and large increases in stocks of grain carried in reserve, the insect problem has become increasingly serious, and the difficulty of obtaining a sufficient quantity of insect-free milling wheats has increased.

Stocks of 1,876 million bushels of wheat stored in all positions on Jan. 1 of this year were the largest of record for that date, 3% larger than the previous year and 57% above average. These large carryover stocks added to an annual production of around 1 billion bushels require the use of several million gallons of heavier-than-air fumigants or their equivalent to prevent losses from insect attack.

Only a portion of these stocks are used by the milling trade. However, the cost of treating them is an appreciable tax which must be added to the cost of producing insect-free flour.

Methods Changed

Methods of combatting the confused flour beetle have changed with the times. Not too many years ago millers depended on an annual fumigation, which reduced the flour beetle population in the mill and warehouse to a low level for the time being but, which did not prevent infestations from building up again to a dangerous level within a few months. It was not uncommon to recondition flour by

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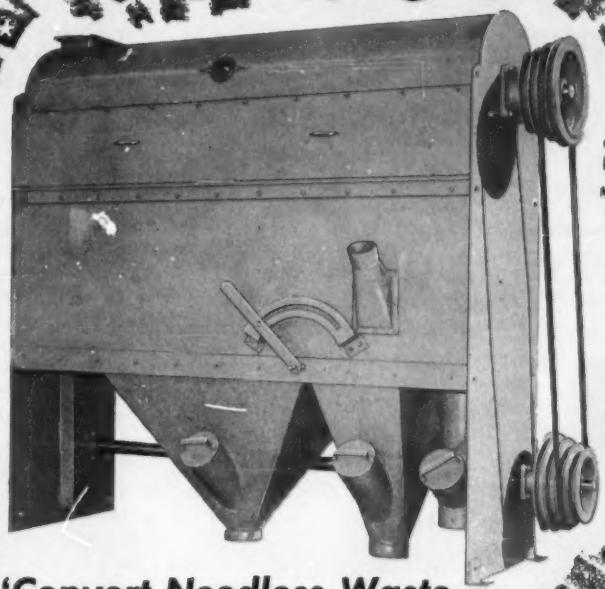

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Dr. Cotton, author of the book "Pests of Stored Grain and Grain Products," will be a regular contributor to THE Northwestern MILLER. He retired recently from the U.S. Department of Agriculture after a distinguished career and he is devoting his spare time to writing, lecturing and consultation work. He was a member of the sanitation committee of the Association of Operative Millers until his retirement in 1957.

bolting it to remove flour beetle infestation before shipment. Returned infested stocks were reconditioned instead of being disposed of as feed.

The necessity of producing uncontaminated and insect-free flour which will meet the high standards of purity demanded in modern times requires vigilance on the part of the miller, strict sanitation, and a program of insect prevention and control which will hold the insect population at or near the vanishing point throughout the year. To see that the program is carried out should be the responsibility of a well trained man assigned to the task.

Surveys have shown that flour beetles of the genus **Tribolium** comprise nearly 85% of the insect population of flour mills. Four species of the genus **Tribolium** occur in the U.S. However, only the confused flour beetle and the red flour beetle are abundant enough to be of importance to the miller. While these two beetles may be found in flour mills in all parts of the country, the confused flour beetle is the predominant species. The red flour beetle is more tropical and more abundant in flour mills in the South than elsewhere. It is the confused flour beetle with which the miller is most concerned.

The confused flour beetle, **Tribolium confusum** was described and named by Jacquelin Du Val in 1868. He gave it the specific name of **confusum** because for years it had been confused with the red flour beetle **T. castaneum**, described by Herbst in 1797, and which it resembles so closely that a magnifying glass is needed to distinguish between the two species.

Troublesome Long Ago

Although the confused flour beetle was described and named less than 100 years ago, it was undoubtedly troublesome in the time of the Pharaohs, at least 4,000 years ago. Specimens of flour beetles have been taken from jars of grain found in Pharaonic tombs of the 6th dynasty (about 2,500 B.C.). At that time commerce, the only means by which this insect is distributed, was restricted to the Mediterranean region and Southern Asia. So presumably, the flour beetle originated in the general region comprising India, Southwestern Asia and the eastern Mediterranean lands. It was unknown on the American continent before the coming of Columbus. However, in the days of sailing vessels, grain and other articles of food were invariably swarming with insects at the end of long voyages, and there is little doubt that supplies of food brought to North America by the colonists were heavily infested with flour beetles and other insects.

It is characteristic of the confused flour beetle that the adults are long lived, the rate of reproduction is high, and generations are comparatively short. A Canadian entomologist, H. E. Gray, has calculated that the progeny of a single pair of confused flour beetles could exceed a million in 150 days. An abundance of food and favorable conditions of temperature and relative humidity are the factors needed to insure rapid increase of a flour beetle population.

The confused flour beetle is unable to fly, so it is dependent upon man to transport it from one place to another.

It is undoubtedly brought into the flour mill by the miller himself. When infested grain is brought into the mill, it is likely to cause contamination throughout the mill. Grain cleaning machinery now in use does not completely remove all insect life. Adults of the confused flour beetle have been found to pass unharmed through the first three breaks, and partly grown larvae have survived passage through the first three middling rolls. Eggs of this species are so small that many of them survive passage through the low grade flour rolls. When these eggs hatch, infestations may quickly reach serious proportions in all streams of the milling unit.

The confused flour beetle is an adaptable creature. It prefers to breed in flour rich in vitamins. Yet it is capable of breeding in all fractions of the wheat kernel and in flour completely devoid of moisture. In the flour mill it will breed in any location where accumulations of flour, grain or other milling stock remain undisturbed. The female adults lay on the average 400 or 500 eggs each, which hatch and pass through the various developmental stages until the adult form is attained in about six weeks. The beetles themselves may live for a year or more. Some individual specimens have been observed to live over three years.

Prevention, Control

To combat this insect, a well organized program of prevention and control must be put into effect. Milling wheats must be selected which are as nearly free from infestation as possible. As an added precaution, centri-

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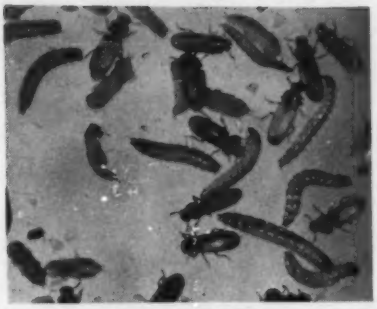

MEET THE ENEMY
(Adults, larvae, pupae of the Confused Flour Beetle)

fugal force can be used to advantage to destroy infestation in both dry and tempered wheat. Efforts should be made to eliminate breeding places which may exist in the mill. Double floors or walls provide harborage for beetles where flour dust and waste grain accumulate and are difficult, if not impossible, to remove. Poorly designed milling units also create problems.

Danger spots are elevator boots, conveyors for flour, grain or dust, conveyors on reels and purifiers, dead spouts and conveyors, dust collecting systems in general and the bottom and idle sections of certain types of sifters.

Redesigning milling equipment or replacing it with modern machinery will do much toward eliminating static accumulations of milling stock in which breeding of the flour beetle may occur. A pneumatic conveying system for milling stock will solve many problems of keeping a mill clean and insect free. Systematic sanitation utilizing v a c u u m, mechanical floor sweepers, judiciously used compressed air jets and contact sprays is necessary.

An active control program of local fumigation of milling units at regular intervals, followed by removal of the fumigated stock, should be inaugurated. Since the flour beetle reproduces at a faster rate when mill temperatures are high, the frequency of fumigation treatments will depend upon the season and the geographical location of the mill. The average mill will require from 10 to 20 local fumigations a year. Those in the South require the more frequent applications.

There are many different types of local fumigants available to the miller. All will give excellent results if applied properly and in sufficient quantity. They include chloropicrin and various mixtures containing carbon tetrachloride, ethylene dichloride, ethylene dibromide, or methyl bromide. For best results they should be used according to directions of the manufacturer. It is estimated that the average mill will require about 200 gallons annually of a standard carbon tetrachloride-ethylene dichloride mixture or its equivalent per 1,000 sack capacity. Naturally, smaller quantities of the more toxic mixtures containing methyl bromide and ethylene dibromide would be required.

General Fumigation

Many mills have completely eliminated the general fumigation, since in the modern, well-designed, concrete mills a regular schedule of local fumigation followed by clean out of the fumigated units can be depended upon to hold the insect population at or near the vanishing point. In the case of old wooden mills which are more difficult to keep clean, a general fumigation with HCN, methyl bromide, or chloropicrin once a year, should be used to supplement the local fumigation program.

If the practice of blending flour is followed and it is necessary to obtain stocks of flour from other mills, it is essential that only flours which have been found to be free from insect contamination be used. These stocks should be run through high speed sifters and then a treating machine using centrifugal force. Overs from the sifters should also be treated with centrifugal force before being spouted to feed.

As a final precaution against flour beetle infestation in the mill, centrifugal force machines should be used in conjunction with sifters for treating the finished flour. The centrifugal force machines can be installed directly in the top of packer bins, or outlet spouts can be directed to one or more bins as desired.

The confused flour beetle probably can never be eradicated. But the miller can make certain that milled cereal products leave the mill in an insect-free condition. «

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CANADIAN COMMENTARY

May wheat flour output by Canadian mills showed a slight rise over April and held just about steady with May of 1959. It dipped somewhat sharply from the 10-year May average (1950-59).

Production for the month was 3,253,000 cwt. compared with 3,141,000 cwt. in April, a rise of 4%. It was close to the May, 1959, offtake of 3,239,000 cwt., but 9% below the 10-year average of 3,586,000 cwt.

In the May production figure, Ontario winter wheat flour amounted to 212,000 cwt. against 208,000 cwt. for the comparable month of last year.

Taking the August-May crop year figures, total production reached 33,498,000 cwt. compared with 33,130,000 cwt. for the equivalent months of the previous crop year.

Mill operations during May averaged 76.6% of capacity computed on a 25-day working period and a daily capacity of 170,000 cwt. Mills operated at 74.1% of their combined rated capacity in April, again for a 25-day period.

Millfeed production in May reached 56,000 tons, 4% over the 53,000 tons in the comparable month of 1959.

Crop Outlook Good, But Rains Needed

Crop prospects look pretty good, but general rains are needed urgently in all three provinces if the situation is to remain that way. Heavy growth has drawn extensively on moisture reserves even where supplies were generous — and scorching temperatures during July have drained moisture supplies severely, setting back crops in some areas.

Areas where the outlook is the poorest generally cover a portion of western Saskatchewan, east-central and southern regions of Alberta.

Early-sown grains were deep rooted, in contrast with late crops which have a poor root system and can be expected to suffer from any prolonged head.

Wheat is fully headed and some early fields, chiefly in Saskatchewan and Alberta, are starting to change color. Barley and oats vary greatly in stages of development, with late crops barely in shotblade, while early stands are fully headed.

Wheat Board Sets 1960-61 Payments

Western farmers will receive an initial price of $1.40 bu., basis No. 1 Northern wheat in store Fort William-Port-Arthur, or Vancouver, through the Canadian Wheat Board in the 1960-61 crop year which begins Aug. 1. It's the same initial price that has been applicable in every crop year since 1959.

Initial prices for basis grades of oats and barley also will be unchanged at 60¢ bu. for No. 2 CW oats and 96¢ for No. 3 CW six-row barley, both on a basis in-store Fort William-Port Arthur or Vancouver. Initial prices for other grades of wheat, oats and barley will be announced later.

Firm Purchased By Dover Subsidiary

Dover Industries, Ltd., which numbers two flour mills among its holdings, has added the ice cream cone division of O. Gauthier, Ltd., Montreal. Purchase was made by Robinson Cone Co., a subsidiary of Dover Industries. Dover's milling interests are the T. H. Taylor Co., Ltd., and S. J. Cherry & Sons, Ltd.

Grain Exchange Official Appointed

It's now official — the Winnipeg Grain Exchange has appointed W. J. Clarke, formerly director of the Vocational School of Agriculture at Kindersley, Sask., as its secretary-treasurer. By way of background, the new secretary-treasurer obtained a master's degree in agriculture in his home province of Saskatchewan, and then spent some time at Iowa State College doing additional studying.

From 1948 to 1953 he served with the economics division, Canada Department of Agriculture, at Saskatoon. It was from here that he took the post at Kindersley.

Wheat, Flour Movement Reported

A total of 10,926,000 bu. Canadian wheat and flour moved to overseas destinations in the first two weeks of July, with flour in terms of wheat accounting for 2,915,000 bu. of the total. The flour moved outward worked down to 1,267,400 cwt., of which 993,900 cwt. is for International Wheat Agreement destinations.

IWA countries took 7,074,000 bu. wheat. Of this figure, 2,777,000 bu. cleared to Japan; 2,448,000 bu. to the U.K.; 679,000 bu. to the Netherlands; 656,000 bu. to India; 226,000 bu. to Germany; and 143,000 bu. to Belgium. Quantities ranging from 27,000 bu. to 83,000 bu. went to Hong Kong, Switzerland and Ireland.

Class 2 wheat exports amounts 937,000 bu. of this, 466,000 bu. cleared to France; 435,000 bu. to Iraq and the remainder to Italy. «

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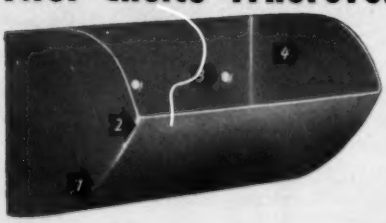

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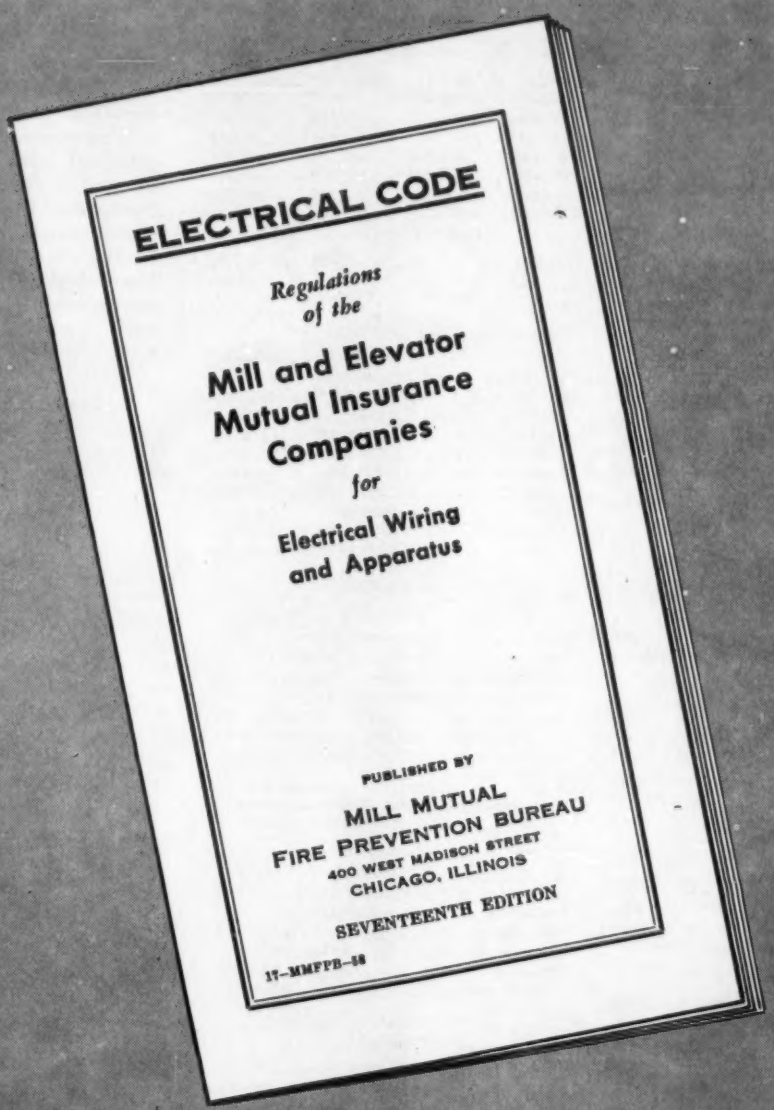
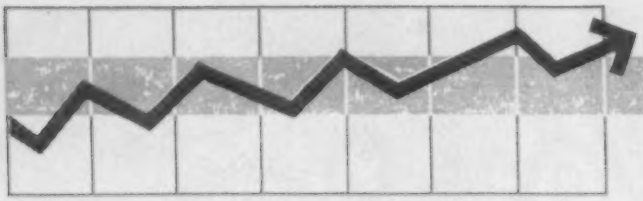


"HOT WIRES CAUSE FIRES"

Mill Mutual Fire Prevention Bureau, 400 W. Madison St., Chicago 6, Ill. (NO. 18, COPIES FOR POSTING ON REQUEST)



FLOUR PRODUCTION

A Statistical Service Provided Continuously for Readers of The Northwestern Miller for More than Half a Century.

WEEKLY FLOUR PRODUCTION, IN SACKS (CWT.)

Flour production in principal manufacturing areas by mills reporting currently to The Northwestern Miller with relationship of production to capacity and to the total estimated output of all mills in the U.S. expressed in percentages:

	July 3-10, 1960	*Previous week	July 5-12, 1959	July 6-13, 1958	July 7-14, 1957
Northwest	479,765	641,008	648,169	659,718	680,847
Southwest	1,319,587	1,329,660	1,440,975	1,383,322	1,195,675
Buffalo	398,185	447,244	527,153	545,204	585,890
Central and Southeast	558,431	462,703	623,831	501,718	519,664
Pacific Coast	385,270	394,010	421,785	314,215	294,300
Totals	3,141,238	3,274,625	3,661,913	3,404,177	3,276,376
Percentage of total U.S. output	74.9	74.9	75	75	75
Estimated total U.S. production	4,193,909	4,371,996			
Accumulated total this month	5,006,019	812,110			

*Revised.

	—Percentage of capacity operated in 5-day week—					Crop year flour production ——July 1 to——	
	July 3-10, 1960	Previous week	July 5-12, 1959	July 6-13, 1958	July 7-14, 1957	July 10, 1960	July 12, 1959
Northwest	67	90	89	99	102	567,607	1,008,669
Southwest	100	101	112	105	91	1,588,893	2,310,462
Buffalo	76	86	107	115	123	487,634	808,900
Central and S. E.	83	69	97	88	91	651,732	899,385
Pacific Coast	83	84	90	100	83	453,643	671,220
Totals	85	89	101	102	97	3,749,509	5,698,636

NORTHWEST

Minneapolis

	5-day week capacity	Flour output	% capacity
July 3-10	240,000	153,666	64
Previous week	240,000	*157,899	66
Year ago	231,000	177,628	77
Two years ago	237,000	221,391	93
Five-year average			60
Ten-year average			82

*Revised.

Principal interior mills in Minnesota, including Duluth, St. Paul, North Dakota, Montana and Iowa:

	5-day week capacity	Flour output	% capacity
July 3-10	472,750	326,099	69
Previous week	472,750	*483,109	102
Year ago	494,500	470,541	95
Two years ago	430,500	438,327	102
Five-year average			142
Ten-year average			128

*Revised.

CENTRAL AND SOUTHEASTERN

Mills in Illinois, Ohio, Michigan, Wisconsin, Indiana, Kentucky, North Carolina, Tennessee, Virginia, Georgia and eastern Missouri:

	5-day week capacity	Flour output	% capacity
July 3-10	672,260	558,431	83
Previous week	672,260	*462,703	69
Year ago	643,750	623,831	97
Two years ago	570,260	501,718	88
Five-year average			100
Ten-year average			103

*Revised.

SOUTHWEST

Kansas City

	5-day week capacity	Flour output	% capacity
July 3-10	224,250	243,136	108
Previous week	224,250	248,981	111
Year ago	221,750	272,249	123
Two years ago	287,500	266,849	93
Five-year average			151
Ten-year average			134

Representative Mills, Outside of Kansas City (Including Wichita and Salina)

	5-day week capacity	Flour output	% capacity
July 3-10	1,090,750	1,076,451	99
Previous week	1,090,750	*1,080,679	99
Year ago	1,068,800	1,168,726	109
Two years ago	1,032,000	1,145,372	107
Five-year average			145
Ten-year average			123

*Revised.

BUFFALO

	5-day week capacity	Flour output	% capacity
July 3-10	522,000	398,185	76
Previous week	522,000	447,244	86
Year ago	493,500	527,153	107
Two years ago	475,000	545,204	115
Five-year average			62
Ten-year average			90

PACIFIC COAST

Principal Mills on the Pacific Coast

California, Oregon and Washington Mills

	5-day week capacity	Flour output	% capacity
July 3-10	466,500	385,270	83
Previous week	466,500	*394,010	84
Year ago	466,500	421,785	90
Two years ago	315,000	314,215	100

*Revised.

Millfeed Production

Mills in the Northwest, Southwest and at Buffalo representing 75% of the combined flour milling capacities of those areas, reported production of 41,468 tons of millfeed for July 3-10. Production of the current week compares with an output of 45,626 tons in the previous week and 49,370 tons in the corresponding week of a year ago.

DURUM PRODUCTS OUTPUT

Durum products output of mills reporting to The Northwestern Miller, in sacks, based on five-day week:

	5-day wk. capacity	Wkly. production	% of capacity
July 3-10	177,500	105,054	59
Previous week	177,500	*124,179	70
Year ago	156,500	154,763	99

	Crop year production
July 1-10, 1960	129,890
July 1-12, 1959	211,851

*Revised.

Milling Capacity At Chief Centers

Seattle-Tacoma-Spokane Flour Mills

Daily capacity in sacks. Source: The Northwestern Miller.

Seattle—	
Fisher Flouring Mills Co.	15,000
Tacoma—	
General Mills, Inc.	8,400
Spokane—	
General Mills, Inc.	4,900
Centennial Mills, Inc.	4,000
Total	32,300

Kansas City (Mo.) Flour Mills

Daily capacity in sacks. Source: The Northwestern Miller.

Kansas Flour Mills Co. (Idle)	14,400
General Mills, Inc.	14,000
Rodney Milling Co.	7,700
International Milling Co.	5,100
Commander Larabee Milling Co. (North Kansas City)	13,500
Total	54,700

Production for July 3-10 is at the left; production for July 10-17 appears on this page

WEEKLY FLOUR PRODUCTION, IN SACKS (CWT.)

Flour production in principal manufacturing areas by mills reporting currently to The Northwestern Miller with relationship of production to capacity and to the total estimated output of all mills in the U.S. expressed in percentages:

	July 10-17, 1960	*Previous week	July 12-19, 1959	July 13-20, 1958	July 14-21, 1957
Northwest	562,003	536,735	670,974	656,938	666,892
Southwest	1,311,794	1,216,737	1,387,081	1,303,044	1,126,775
Buffalo	534,388	516,441	508,171	576,455	547,599
Central and Southeast	602,271	558,594	596,447	576,600	510,637
Pacific Coast	410,935	378,085	422,573	269,212	312,655
Totals	3,421,391	3,206,592	3,585,246	3,382,249	3,164,558
Percentage of total U.S. output	77.3	77.3	75	75	75
Estimated total U.S. production	4,426,120	4,148,243			
Accumulated total this month	9,386,473	4,960,353			

*Revised.

	—Percentage of capacity operated in 5-day week—					Crop year flour production ——July 1 to——	
	July 10-17, 1960	Previous week	July 12-19, 1959	July 13-20, 1958	July 14-21, 1957	July 17, 1960	July 19, 1959
Northwest	79	75	92	98	100	1,186,580	1,679,643
Southwest	100	93	107	102	85	2,797,837	3,697,543
Buffalo	102	100	103	121	115	1,140,278	1,317,071
Central and S.E.	90	83	93	101	90	1,254,166	1,495,832
Pacific Coast	88	81	91	85	88	857,393	1,093,793
Totals	93	87	99	101	94	7,236,254	9,283,882

NORTHWEST

Minneapolis

	5-day week capacity	Flour output	% capacity
July 10-17	240,000	165,932	69
Previous week	240,000	*162,023	68
Year ago	231,000	203,088	88
Two years ago	237,000	217,441	92
Five-year average			56
Ten-year average			80

*Revised.

Principal interior mills in Minnesota, including Duluth, St. Paul, North Dakota, Montana and Iowa:

	5-day week capacity	Flour output	% capacity
July 10-17	472,750	396,071	84
Previous week	472,750	*374,712	79
Year ago	494,500	467,886	95
Two years ago	430,500	439,497	102
Five-year average			140
Ten-year average			128

*Revised.

CENTRAL AND SOUTHEASTERN

Mills in Illinois, Ohio, Michigan, Wisconsin, Indiana, Kentucky, North Carolina, Tennessee, Virginia, Georgia and eastern Missouri:

	5-day week capacity	Flour output	% capacity
July 10-17	672,260	602,271	90
Previous week	672,260	*558,594	83
Year ago	643,750	596,447	93
Two years ago	570,260	576,600	101
Five-year average			100
Ten-year average			103

*Revised.

SOUTHWEST

Kansas City

	5-day week capacity	Flour output	% capacity
July 10-17	224,250	241,043	107
Previous week	224,250	243,136	108
Year ago	221,750	242,884	110
Two years ago	287,500	255,121	89
Five-year average			152
Ten-year average			135

Representative Mills, Outside of Kansas City (Including Wichita and Salina)

	5-day week capacity	Flour output	% capacity
July 10-17	1,090,750	1,070,731	98
Previous week	1,090,750	*973,601	89
Year ago	1,068,800	1,144,197	107
Two years ago	1,032,000	1,047,923	102
Five-year average			145
Ten-year average			123

*Revised.

BUFFALO

	5-day week capacity	Flour output	% capacity
July 10-17	522,000	534,388	102
Previous week	522,000	*516,441	100
Year ago	493,500	508,171	103
Two years ago	475,000	576,455	121
Five-year average			61
Ten-year average			90

PACIFIC COAST

Principal Mills on the Pacific Coast

California, Oregon and Washington Mills

	5-day week capacity	Flour output	% capacity
July 10-17	466,500	410,935	88
Previous week	466,500	*378,085	81
Year ago	466,500	422,573	91
Two years ago	315,000	269,212	85

*Revised.

Millfeed Production

Mills in the Northwest, Southwest and at Buffalo representing 75% of the combined flour milling capacities of those areas, reported production of 45,442 tons of millfeed for July 10-17. Production of the current week compares with an output of 42,833 tons in the previous week and 48,425 tons in the corresponding week of a year ago.

DURUM PRODUCTS OUTPUT

Durum products output of mills reporting to The Northwestern Miller, in sacks, based on five-day week:

	5-day wk. capacity	Wkly. production	% of capacity
July 10-17	177,500	100,752	57
Previous week	177,500	*105,933	60
Year ago	156,500	167,918	107

	Crop year production
July 1-17, 1960	231,521
July 1-19, 1959	379,769

*Revised.

Milling Capacity At Chief Centers

Buffalo Flour Mills

Daily capacity in sacks. Source: The Northwestern Miller.

General Mills, Inc.	36,700
International Milling Co.	15,200
International Milling Co. (Baldwinsville) (Durum only)	3,200
Pillsbury Co.	24,700
Russell-Miller Milling Co.	9,450
Standard Milling Co.	6,300
George Urban Milling Co.	6,000
Total	101,550

Chicago Flour Mills

Daily capacity in sacks. Source: The Northwestern Miller.

B. A. Eckhart Milling Co.	6,000
General Mills, Inc.	7,900
Total	13,900

Superior (Wis.) Flour Mills

Daily capacity in sacks. Source: The Northwestern Miller.

King Midas Flour Mills (Durum only)	8,200

LEADING FLOUR IMPORTERS ABROAD

Many of the firms appearing in this list are available to handle the importation of other products besides flour. Some specialize additionally in cereals, some in bakers' sundries and others in feed grains and ingredients. Most of them have connections in adjacent countries and are equipped to handle both import and export business on an extensive basis. For a list of recommended firms dealing in specific commodities or in specific countries write to THE Northwestern MILLER, P.O. Box No. 67, Minneapolis 40, Minn., U.S.A.

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Cable Address: Bortrite, London

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52, Mark Lane LONDON, E.C. 3
Cable Address: "Dorfeach," London

GERMANY

Einfuhrhandel Mannheim
Hans Werle
MANNHEIM/GERMANY, E2., 1-3
Cable Address: "Einfuhr" Telex 0463270

DENMARK

Brodr. Justesen
COPENHAGEN
Cable Address: "Justesens," Copenhagen

SCOTLAND

Farquhar Brothers
50 Wellington Street GLASGOW,C.2
Cable Address: "Glencairn," Glasgow

McConnell & Reid, Ltd.
19 Waterloo St. GLASGOW
Cable Address: "Marvel," Glasgow

D. T. Russell & Baird, Ltd.
106 Hope Street GLASGOW,C.2

HOLLAND

Bulsing & Heslenfeld N. V.
Established 1885
Damrak 20-22
AMSTERDAM (C)
Cable Address: "Heslenfeld," Amsterdam

STOLP & CO., LTD.
47-48 Damrak AMSTERDAM
Cable Address: "Cleo"

Gebrs. Van Den Bergh's N. V.
ROTTERDAM
Cables: Locomotion Rotterdam

N. V.
Algemeene Handel-en
Industrie Maatschappy
"MEELUNIE"
Heerengracht 209 AMSTERDAM

N. V. Agentuur & Commissiehandel
v/h P. C. Vis & Co.
AMSTERDAM
Cable Address: "Visco"

Luchsinger, Meurs & Co.'s
Handelsmaatschappij, N.V.
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H. C. Edwards Named President Of Dixie-Portland

Hubert C. Edwards was elected president of the Dixie-Portland Flour Mills, Inc., at a meeting of the directors of the milling firm, held in Memphis. Mr. Edwards, who has been vice president and general sales manager, succeeds John A. Stout, who was named honorary chairman of the board.

Mr. Edwards will continue to make his headquarters at the company offices at Higginsville, Mo., near Kansas City, as a central location between the company's plants and important sales territories.

Other officers elected at the meeting were William L. Taylor, chairman of the board; John B. Stout, vice president and manager of the Chattanooga (Tenn.) mill; Morris A. Wilkins, vice president and manager of the Arkansas City (Kansas) mill; John T. Stout, Memphis, vice president and treasurer, and Roy Woodall, Memphis, secretary. Mr. Taylor is chairman and president of the Federal Compress & Warehouse Co., Memphis, of which Dixie-Portland Flour Mills is a wholly owned affiliate.

Three new directors were elected: John B. Stout, Morris A. Wilkins and John T. Stout. Other directors of the firm are John A. Stout, Mr. Taylor, Mr. Edwards and F. F. Cooper, executive vice president of Federal Compress & Warehouse Co.

Modernization Plans

Directors authorized a modernization program for the company's mills at Chattanooga and Arkansas City, which will involve extensive remodeling in converting the plants to pneumatic handling and in making other changes in equipment.

The first step will be taken with the letting of a contract for new Henry Simon purifiers at both plants. The newest unit of the Chattanooga mill, completed a short time ago, is a pneumatic plant. The older unit now will be converted to pneumatic handling, as will the entire plant at Arkansas City. The rebuilding job, which will be done in stages while the mills continue to operate, is expected to be completed in 1962.

Capacity Figures

The capacity of the Chattanooga plant is 8,500 cwt. daily and the Arkansas City mill 9,500 a total of 18,000 cwt. daily.

The new president, Mr. Edwards, started in the milling business with the predecessor Dixie-Portland Flour Co. and grew up in the firm, becoming manager of the Higginsville (Mo.) Flour Mill unit of the former company. Later, he devoted more time to general sales, particularly in the baking industry, and was made vice president and general sales manager when Federal Compress purchased the Dixie-Portland properties about a year ago. «

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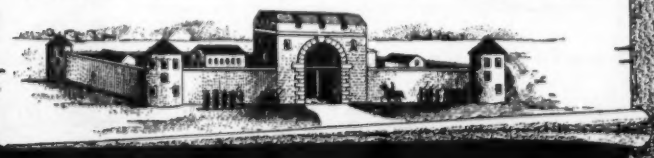

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Montreal
ALL
CABLE CODES
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Makers of CANADIAN HARD SPRING WHEAT *Flour*
Mills at
Montreal, Keewatin, Winnipeg, Medicine Hat
HEAD OFFICE: MONTREAL
WESTERN OFFICE: WINNIPEG

WHERE THEY ARE MEETING

August

Aug. 6—District 4, Association of Operative Millers; Curtis Hotel, Minneapolis, Minn.; sec., W. A. Howie, J. K. Howie Co., Metropolitan Bldg., Minneapolis.

August 13—District 14, Association of Operative Millers; Denver, Colo.; sec., John Streit, Wallace & Tiernan, Inc., Denver.

September

Sept. 9-10—District 7, Association of Operative Millers; Lake Murray Lodge, Ardmore, Okla.; sec., Henry H. Stark, Ross Machine & Mill Supply Co., Oklahoma City, Okla.

Sept. 11-13—Southern Bakers Assn., annual production conference; Dinkler Plaza Hotel, Atlanta, Ga.; sec., Benson L. Skelton, Henry Grady Bldg., 26 Cain St. N.W., Atlanta 3, Ga.

Sept. 13—Bakers Courtesy Club of Pittsburgh, annual bakers clinic and tri-state convention; Webster Hall Hotel, Pittsburgh; sec., John P. Byrnes, 1133 Penn Ave., Pittsburgh.

Sept. 15-16—Virginia Bakers Council, Inc., 1960 Virginia Bakers Conference; Williamsburg Lodge, Williamsburg Va.; sec., Harold K. Wilder, 5 South 12th St., Richmond, Va.

Sept. 16-17—District 5, Association of Operative Millers; Pere Marquette State Park, Grafton, Ill.; sec., G. Edward Mehleck, Alexander Bros. Belting Co., Chicago.

Sept. 16-17—District 1, Association of Operative Millers; Rambler Hotel, Hutchinson, Kansas; sec., Richard Magerkurth, C-G-F Grain Co., Topeka, Kansas.

Sept. 17-20—New Jersey Bakers Board of Trade, Inc., annual convention and exhibition; The Berkeley Carteret Hotel, Asbury Park, N.J.; sec., Michael Herzog, 48 Claremont Ave., New Brunswick, N.J.

Sept. 18-21—Missouri Bakers Association, fall outing and meeting; starting at 5 p.m., Sept. 18, ending after breakfast Sept. 21, Arrowhead Lodge, Lake Ozark, Mo.; sec., George H. Buford, 2214 Central Ave., Kansas City 2, Kansas.

Sept. 21-23—Pennsylvania Millers & Feed Dealers Assn.; Hotel Penn Harris, Harrisburg Pa.; sec., Donald W. Parke, P.O. Box 329, Ephrata, Pa.

Sept. 22-23 — Michigan State Millers Assn., annual meeting; Hidden Valley, Gaylord, Mich.; sec., C. D. McKenzie, Jr., P.O. Box 35, Owosso, Mich.

Sept. 23-24—District 2, Association of Operative Millers; Aladdin Hotel, Kansas City, Mo.; sec., George Smutny, Safety Industries, Inc., Kansas City, Mo.

Sept. 24-26—Southwest Bakers Assn., annual convention; Herring Hotel, Amarillo, Texas; sec., J. R. L. Kilgore, P.O. Box 127, Albuquerque, N.M.

Sept. 30-Oct. 1—District 9, Association of Operative Millers; Benjamin Franklin Hotel, Seattle, Wash.; sec., Richard Schmidt, Centennial Mills, Inc., Spokane, Wash.

October

Oct. 2—Kansas Bakers Assn., annual fall meeting; Allis Hotel, Wichita, Kansas; sec., Warren M. Burke, 3232 Roanoke Rd., Kansas City, Mo.

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Burroughs modernized business accounting
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PERCY KENT DEMONSTRATED
THAT MATERIALS + SERVICE + QUALITY
add up to something new
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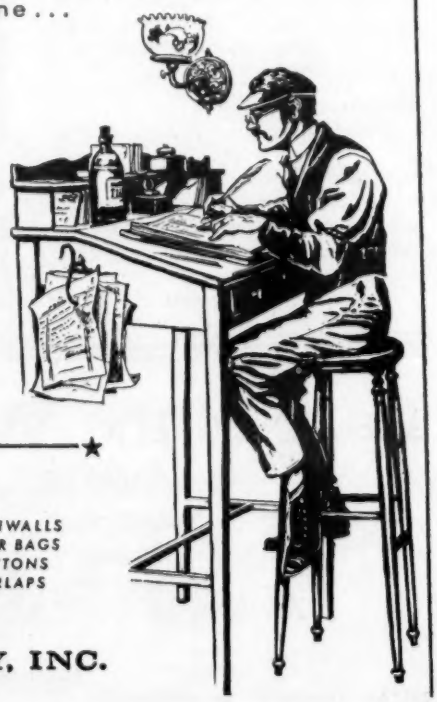


SINCE 1885

MULTIWALLS
PAPER BAGS
COTTONS
BURLAPS

PERCY KENT BAG COMPANY, INC.
KANSAS CITY • BUFFALO • NEW YORK

RATE PROPOSAL (From page 39)

Most mills have labor agreements requiring an additional man in the crew loading an 80,000 lb. car or larger.

These are important factors that have a direct bearing on what you are trying to do.

If you feel something has to be done in regard to minimum weights, then we believe less injury will be done to the trade and just as much, if anything, will be accomplished by raising the present 40,000 lb. to 50,000 lb., but have only one minimum.

In connection with minimums, special consideration must be given to low density products which are normally included in mixed carload with flour and other grain products.

Rate Levels

In the main, three rate levels are proposed in lieu of one. Our interpretation is that a new base grain scale excluding proportionals from western gateway has been designed to apply from and within central territory and IFA. Up to 215 miles there seems to be no relationship as between 60,000 lb. and 80,000 lb. minimums. Over that distance the 60,000 lb. rates appear to be 5¢ over the scale and the 80,000 lb. rates ½¢ over the scale. This latter statement is equally true from these territories into trunk line and New England.

The net effect seems to be both increases and decreases in the 60,000 lb. level and decreases in the 80,000 lb. level.

The 40,000 lb. level is a class rate, close to column 17½ of the 28,300 scale, and results in substantial increases with few exceptions. The committee states that in its opinion there is no need for a relationship between the grain scale and products rates on this minimum.

With this we take violent exception. There must be a relationship between transportation charges and equality in rate level as between large and small shippers and large and small buyers. This can be brought about only by having one level on grain products.

What we are actually saying is that within the grain and grain products rate structure there is no room or necessity for incentive rates.

The level of grain rates is too high today. On bakery flour our transportation cost factor runs from 18% to 35% of our delivered price. Where can you find an industry that bears such a high cost to move its goods?

We believe that the best interests of both carrier and shipper lie in equal rates on wheat and flour, and deviation from this principle will prove harmful to both.

Three-Way Rule

We believe in the propriety of a three-way rule; but we also believe such a rule, if promiscuously applied, will cause undue harm to individuals so we, therefore, ask that you be liberal in your exceptions. Each miller involved should be given an opportunity to prove his injury, and we hope

There is a lot to be said for
GOOD JUDGMENT

Good judgment has guided Ogilvie Flour Mills for more than a century and a half of leadership in the milling of fine flour. It's good judgment that causes Ogilvie to select only the choicest wheat . . . that combines their skill and knowledge with some of the most modern milling equipment in the world, to produce the unvarying high quality that their customers expect of the name "Ogilvie".

Ogilvie Flour Mills intend to continue using good judgment . . . the same good judgment that tells you it's wise to buy quality!

Manufacturers of Ogilvie Flour—Ogilvie Ready Mixes —Ogilvie Vita-B Wheat Germ Cereal—Ogilvie Oats —Ogilvie "Miracle" Feeds for livestock and poultry.

THE OGILVIE FLOUR MILLS CO., LIMITED

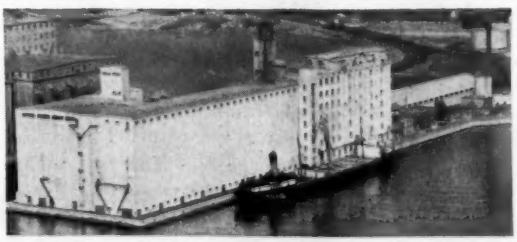
Mills at: Montreal—Fort William—Winnipeg—Medicine Hat—Edmonton
Cable Address: OGILVIE MONTREAL—all codes used

Maple Leaf Milling Co. Limited.

TORONTO, CANADA

CABLE ADDRESS
"MAPLEFLOUR"

1910 1960 50 Years OUR GOLDEN ANNIVERSARY YEAR



"A Seat on the Aisle"

All Seaway traffic passes Canada's largest flour mill, the Maple Leaf mill at Port Colborne, situated at the Western entrance to the Welland Canal.

MILLS & FEED PLANTS LOCATED—

Montreal • *Toronto* • *Goderich* • *Port Colborne*
Winnipeg • *Medicine Hat* • *Calgary* • *New Westminster*

Changes in Rate (continued)

you will be liberal in your treatment of his problems.

A contention that routing within official territory has been too broad probably has considerable merit. The proposal proposes no routes but certainly infers a curtailment of present routes. We sincerely ask you to be liberal in your approach to the routing question. You should bear in mind that industry and business has been built on the present routes and we do not believe it proper or in your interest to destroy industry.

The Chicago futures market is of the utmost importance to the milling industry. Any change in rates or routing that adversely affects that market will adversely affect the industry. We hope you will continue to move grain through Chicago so deliveries can be made on the futures market.

The proposals cover such a vast field; so many factors are involved, that it is humanly impossible to make a proper analysis and draw proper conclusions as to its effect.

The committee has done, no doubt, an outstanding job in putting together proposals covering such a vast area. We feel, however, that many of the proposals are made without knowledge of or proper consideration to the needs of industry. We believe this to be a mistake and hope it not too late to correct it.

With the changes in modes of transportation we are in the most confused state known to any of us. Actually, what the traffic will bear is a more important factor in rate making today than ever before, and we fear and feel the proposals do not take proper cognizance of this fact.

Now the question arises, since we feel that there is more bad than good in the proposals, "what can be done about them?"

It is impossible in a public hearing of this size to develop those things that will lead to the best solution of the many problems created. We therefore suggest that there be an earnest effort made to consult with the various facets of the industries involved. The purpose is to understand each others' problems and to agree on basic principles which will permit the creation of an adjustment that will not do violence to either carrier or shipper.

We are sure there would be give and take on both sides and that a workable adjustment could result. If this is not done, we fear such far reaching changes as suggested can only result in suspension, and if the commission has to prescribe rates in the end, we will probably all be the loser. «

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FOREIGN FLOUR DOMESTIC
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Obituary

THOMAS L. BROWN, 83, at Orinda, Cal. Mr. Brown was a veteran of the flour business, having started work with the Washburn-Crosby Co. at the age of 16. He rose to manager of the durum mill, later went with the Commander Larabee Milling Co. as durum mill manager at Minneapolis.

Mr. Brown went west about 10 years ago and retired about two years ago. Survivors are his wife, Ellen, daughters Mrs. Clinton Easterbrook, Orinda; Miss Ellen Brown, San Francisco; sisters Miss Eliza K. Brown, Minneapolis; Mrs. John F. Dulebohn, Minneapolis; a brother, Samuel P. Brown, in the flour brokerage business at Lansdowne, Pa.; another brother, John F. Brown, Chatham, Mass., who was with Russell-Miller Milling Co. (now Russell-Miller-King Midas Mills) some years ago but is now retired; and 2 grandchildren. «

MILL SITE PLAQUE

A plaque marking what is believed to be the approximate site of the first commercial flour mill in Minnesota has been placed and dedicated. The Washington County Historical Society and the Minnesota highway department provided the marker for positioning near the town of Afton. Records indicate that the mill was established in 1843 by Lemuel Bolles, whose descendants attended the dedication. «

Corn Miller Hits Insects Hard and Profits Increase

A product that's more acceptable just naturally brings more profit.

That's that, and so far as E. E. Pattillo, who operates the Tallapoosa Milling Co. in East Tallassee, Fla. is concerned, he's doing his best to prove it. By changing his process to turn out a cleaner corn meal, Mr. Pattillo claims to have raised his profits by 30¢ cwt., along with reducing the fragment count of his product to zero compared with a count of 300 to 400 other places.

The corn miller actually has applied to his operations a system of insect control long used by wheat millers. The heart of his system is an Entoleter impact mill. Control is just a matter of dropping the corn on the Entoleter's rapidly revolving disc, from which it is thrown off at high velocity—with the insects killed in the process.

Mr. Pattillo has installed a second Entoleter infestation destroyer just ahead of his packing bin just in case any insects are accidentally introduced during the milling process. He contends that the finished corn meal now comes out 100% free of infestation.

Of course the final corn meal products is a more attractive as well as a purer one.

"We're going to break the barrier in the Southeast and usher in the sonic boom in corn milling," says Mr. Pattillo. «

E. E. PATTILLO, Alabama corn miller, has zeroed in on insect problems by using an Entoleter impact mill to "blast off" the insects. That's the reason for his smile and the healthier corn meal products pictured here.

'We Need to Train More Young People,' AACC Head Tells Section at Bozeman

The urgent need for more young people to train in the vital field of cereal chemistry—and for chemists to encourage such a movement—were stressed during the 26th annual meeting of the Pacific Northwest Section, American Association of Cereal Chemists, held at Montana State College, Bozeman.

Dr. John A. Johnson, national AACC president, was the one who emphasized this need. He punctuated his message with a reminder that "the history of cereal chemistry has been a glorious one of which we should be proud."

Dr. J. A. Johnson

The national president's message was just one of many presented as part of a full program that ranged through control of cereal starches and sugar, crop improvement work, food additives, wheat identification, mill evaluation, baking procedure value, and several other pertinent topics.

Crop Report

As the representative for the host group, Pres. R. R. Renne of Montana State extended the formal welcome to the section. The whole program was given its spark by Doyle C. Udy, Western Wheat Quality Laboratory, who acted as chairman. Dr. A. H. Post of Monana State came on early during the first day's program to explain departmental organization and research at the college.

Dr. Doyle Udy

Bread Flavor

Dr. Johnson did double duty during the meeting—he also delivered the keynote paper, covering the subject or bread flavor. He stressed the fact that only in the last decade have techniques been developed that actually enable the cereal chemists to detect, separate, isolate and identify flavor compounds found in bread.

"Great strides have been made since these techniques became available," he stated. "However, the field of bread flavor still has many uncertainties."

The subject of food additives was handled by Dr. J. K. Krum, assistant technical director of Sterwin Chemicals, Inc. He discussed recent changes in the Food, Drug and Cosmetic Act. Dr. David F. Houston, Western Utilization Research and Development Division, U.S. Department of Agriculture, spoke on lipids and lipoproteins in wheat flour, reviewing the types of lipids to be found. He also discussed the quantities of each type in flour.

The Rev. Paul B. McCleave, D.D., Montana State College, spoke at the annual banquet on the high cost of educating and training in U.S. colleges.

A group from Montana State held the floor for several subjects. Zeke Theis, C. A. Watson, R. B. Potts and R. K. Bequette began the session by covering the subject of "Identification of Montana Hard Red Wheats by Kernel Characteristics." Mr. Watson, Mr. Bequette and Mr. Potts then discussed, one after another, the topics "Evaluation of the Brabender Quadruplex Mill," "Value of the Remix Straight Dough Baking Procedure" and "Demonstrating Wheat Quality to Laymen."

Other speakers and their subjects were: Frank R. Ofner, Industrial Processes, Inc., "Control of Cereal Starches and Sugars"; H. R. Elling and M. A. Barmore from the Western Wheat Quality Laboratory at Washington State University, "Microtests for Flour Quality," and W. F. Sollars, Washington State, "Fate of Chlorine in Flour Bleaching."

Several firms were specifically mentioned for their cooperation in making the meeting a success: Scientific Supplies Co.; P. G. Callison; Udy Analyzer Co.; Wallace & Tiernan, Inc.; Montana Flour Mills Co.; Sterwin Chemicals, Inc.; Chas. Pfizer & Co., Inc., and Merck & Co., Inc.

THESE ARE THE MEN who will hold responsibility for affairs of the Pacific Northwest Section, American Association of Cereal Chemists, for 1960-61. Left to right they are Donald W. Pitts, Montana Flour Mills Co., elected as vice chairman at the recent annual meeting in Bozeman; A. J. Shogan, Centennial Mills, Inc., chairman, and Victor J. Evans, Fisher Flouring Mills Co.

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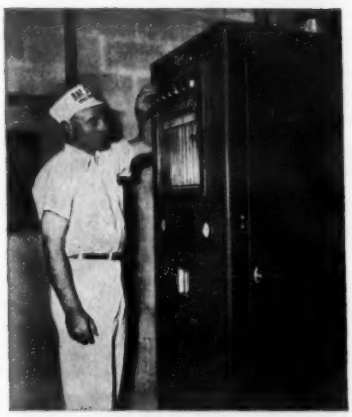

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One important reason bread has held its place in human hearts is that bread has always changed with the changing world.

General Mills is proud to share responsibility for helping the arts of milling and bread-baking keep up with the wants of today's people—and tomorrow's.

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